

April 1933

TECHNOLOGY REVIEW



technology review

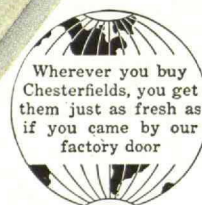
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*B*y the way, you know
friends sometimes offer me
Chesterfields, and about the
only thing they say is, "I be-
lieve you'll enjoy them!"

they Satisfy



*— the Cigarette that's Milder
the Cigarette that Tastes Better*

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THE TABULAR VIEW

LAST January The Review presented a judicial examination of the six basic methods that have been devised for producing better houses cheaper. In this issue it presents a tentative plan for slum clearance, embodying a revision of current ideas about the development of real property and calling for a complete change from a speculative basis to an investment basis for land and house values. ¶The author of this plan is Professor ROSS F. TUCKER, '92, Head of the Course in Building Construction at M. I. T. Before coming to Technology in 1926, he was on the construction staff of the Thompson-Starrett Company. A gifted and skilled engineer, he pioneered in the development of reinforced concrete construction and he has made many other important contributions to the art of building. During the War he supervised the construction of water supply and sewage systems for Nitro, W. Va. It is reported that Professor Tucker, a great lover of animals, was called suddenly to take charge of the above project, and being unwilling to leave a pet cat, packed it in a basket and took it with him on the train. In West Virginia, the cat became quite a mountaineer and, as befitting a construction engineer, stood steadfastly by, for better or for worse, during the construction of the great project. ¶The articles on housing published in The Review supplement a series of three volumes under the title of "The Evolving House," which the Technology Press is publishing. The first of these volumes, "A History of the Home" is now available.

CHARLES SINGER, author of the article on optics on page 247, is an outstanding authority on the history of science. After a classical education, he took degrees in science and in medicine, and he has lectured at Oxford on the History of Biology and at University College, London, where he is now Professor of the History of Medicine. He was President of the Third International Congress of the History of Medicine, held in London in 1922, and President of the International Congress of the History of Science, held in London in 1931. Among his published works are: "Studies in the History and Method of Science," "Greek Biology and Greek Medicine," "Early English Magic and Medicine," "Greek Science and Modern Science: a Comparison and a Contrast," "The Discovery of the Circulation of the Blood," "From Magic to Science," "A Short History of Medicine," "A Short History of Biology," "On the Frontiers of Science," "Science Through the Ages: A Sketch of the History of Science," and "Neolithic Representations of the Human Form from the Islands of Malta and Gozo" (with the Hon. Th. Zammit, C.M.G.). ¶Professor TENNEY L. DAVIS, '13, is a Contributing Editor to The Review and since 1926 has been an Associate Professor of Organic Chemistry at Technology. His contributions include: "Primitive Thinking" (July, 1929), "The Pill of Immortality" (May, 1931), and "Science and the Purposes of Life" (May, 1932).



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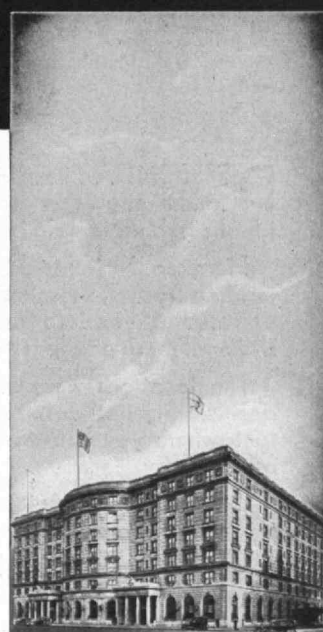
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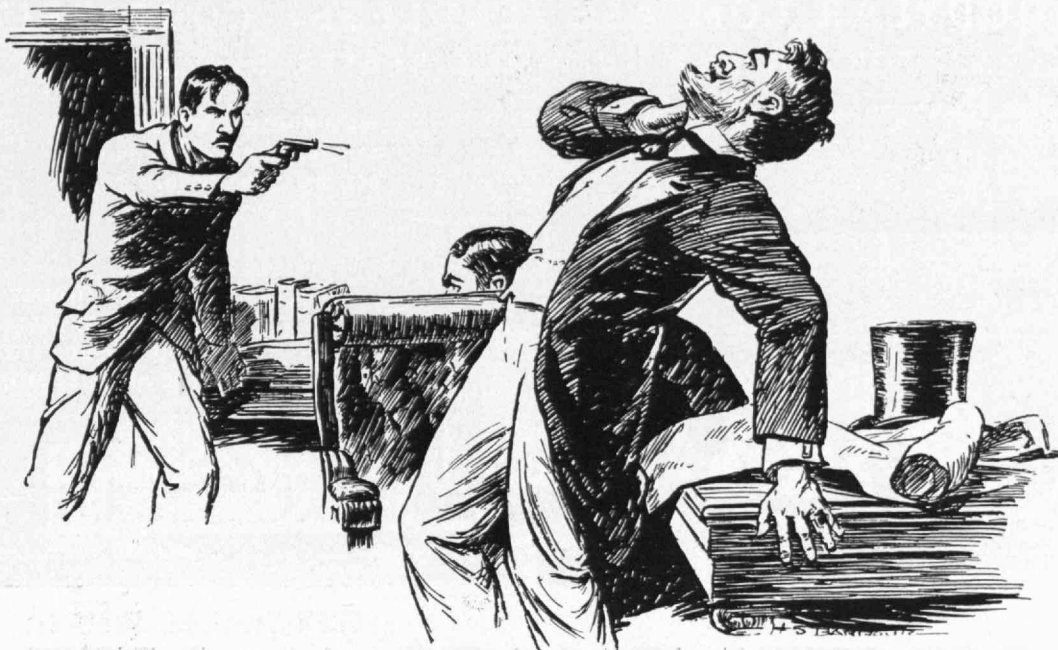
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 in New York

End of Homestead Strike



In the summer of 1892, while financial panic swept the U. S., the most bitter and bloody labor dispute of U. S. history focused public attention on the Homestead steel mills, near Pittsburgh. There Amalgamated Association, powerful steel unit in six-year old American Federation of Labor, clashed in a finish fight with labor's Number One Enemy, Carnegie Steel's Henry Clay Frick.

Rejecting all of the Union's demands, tycoon Frick declared a general lockout in the Homestead mills, next day found the town an armed camp in the hands of the workmen. After several pitched battles between strikers and strike breakers, militia men were ordered in, established martial law. Newspapers filled with stories of strikers privations fanned public sentiment against Frick and Carnegie Steel Company to white heat. Weeks dragged by, mills remained idle, and iron fisted Frick was forced to play a waiting game.

As *TIME*, had it been printed three weeks after the first outbreak, on July 28, 1892, would have reported subsequent events:

For weeks screaming headlines have focused popular attention on the Homestead Strike, battle between organized steel workers and individualistic Henry Clay Frick. Nowhere throughout the U. S. had the newspaper headlines screamed louder than in a small ice-cream parlor in Worcester, Mass.

There the owners, two dark haired excitable anarchists, Emma Goldman and thin slavic Alexander Berkman, awaited impatiently each new dispatch from the strike center. In each new outbreak they

pictured the growing pains of an impending social revolution, itched to lend a helping hand.

Impulsively they started for Pittsburgh, ran out of funds in New York. Emma Goldman unable to raise money soliciting on the streets, begged, borrowed Berkman's train fare to Pittsburgh. As all negotiations between strikers and Frick collapsed, Berkman appeared at the Carnegie Steel offices, describing himself as the representative of a New York employment agency.

Five times last week Berkman tried to interview Scot Frick. Five times he was refused audience. The fifth time, starting to leave the waiting room he wheeled suddenly, pushed past the colored attendant, marched straight into the private office of Carnegie Steel's Chairman. Grizzled, unimaginative Frick rose from a conversation with one of his assistants, turned towards the door.

Berkman took two steps forward, drew a pistol from his pocket, fired point blank. As Frick fell to the floor, like a flash his assistant grappled with Berkman. More shots, cries for help, brought attendants running to find Frick shot twice in the neck, stabbed several times with a poisoned file.

Frick, streaming blood, braced himself against a desk. As Berkman rode off to jail, he continued to work until an ambulance arrived. Immediately he wired to Scotland—sojourning Carnegie. "I am still in shape to fight the battle out."

Later in the afternoon Homestead strikers were dazed by the news of the terroristic act in which none of them had any part. Said Hugh O'Donnell, leader of the workers, "The bullet from Berkman's pistol went straight through the heart of the Homestead Strike."

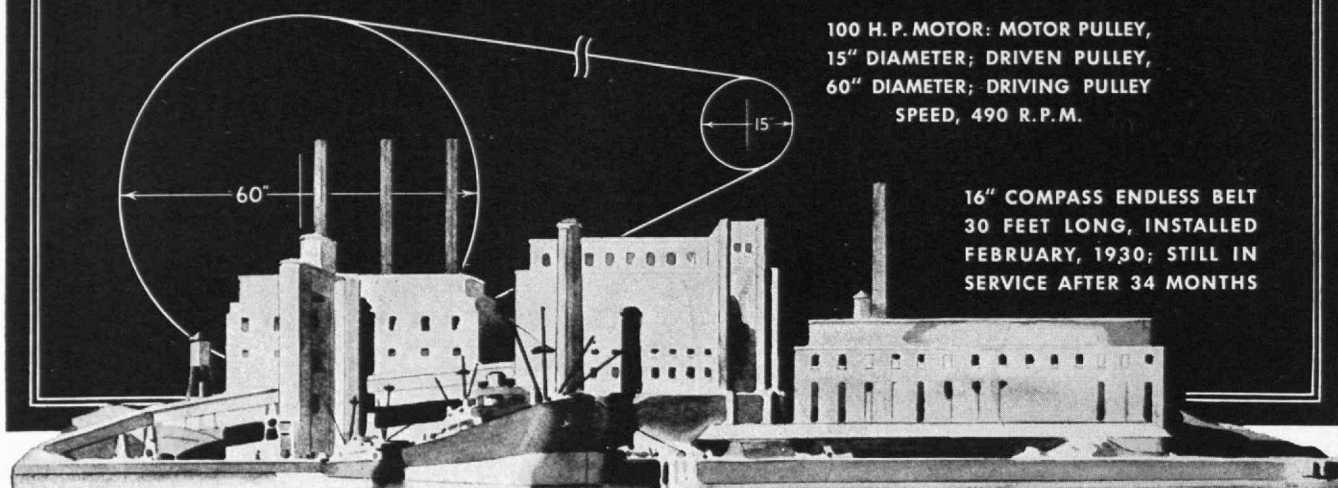
Meanwhile the U. S. public, partial to all martyrs, read new screaming headlines making Frick a new hero, turning public opinion against strikers.

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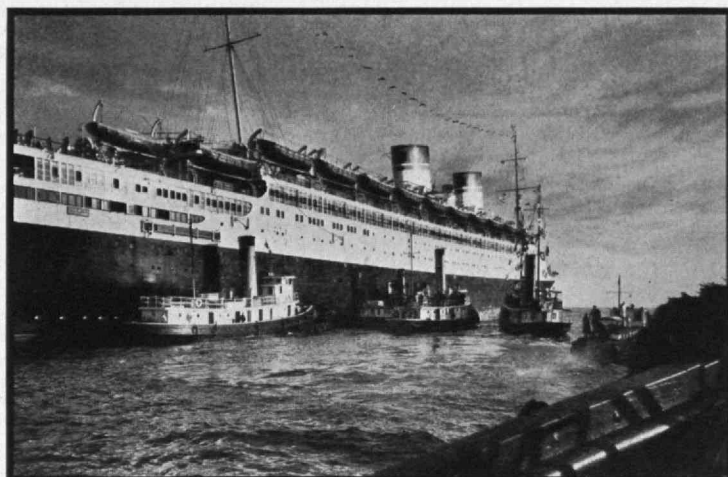
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THE TECHNOLOGY REVIEW

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Edited at the Massachusetts Institute of Technology

VOLUME 35

NUMBER 7

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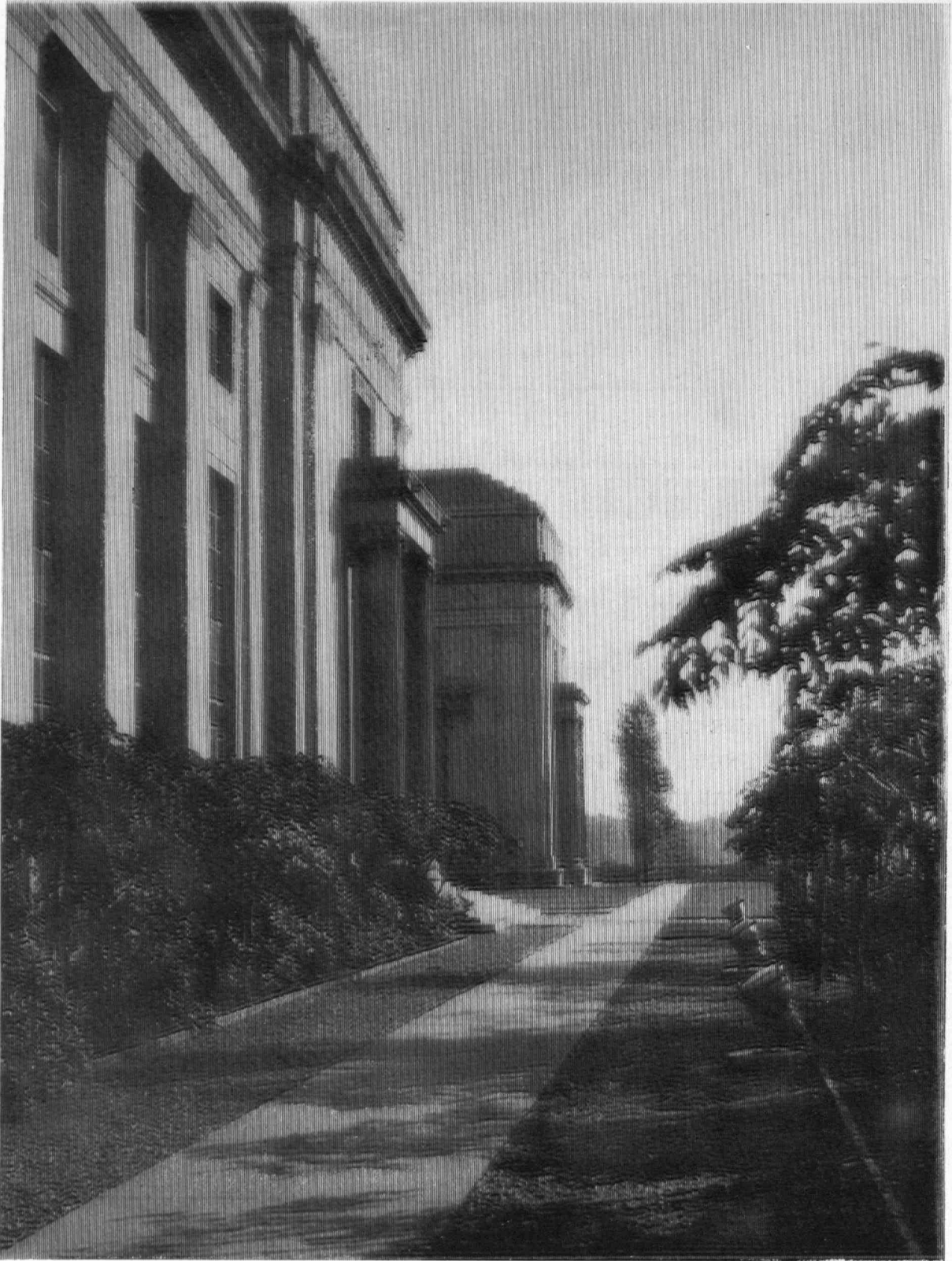
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A NEW ENGRAVING PROCESS

The above picture, taken in the Institute's Great Court, is printed from an engraving made by a new process entirely different from the usual photo-etching method. The photograph to be reproduced is mounted on a revolving cylinder, where it is scanned by an "electric eye." The faint electrical impulses sent out by this "eye," averaging one six-hundred millionth of the current necessary to excite a 60-watt bulb, are amplified up to one-third of a horse power and used to operate a sharp engraving tool, which cuts into the rotating zinc plate to a depth varying from a thousandth to one nine-thousandth of an inch. The tool follows the "scan" of the electric eye and cuts areas of light and dark, corresponding to the light and dark elements of the picture.

By this process a single-column newspaper cut has been made in about four minutes, and three-color plates finished in a half hour. The inventor of the machine is Walter Howey, Director of International News Photos. One of the machines has been installed by the Boston Daily Record, which made the above cut available to The Review

THE TECHNOLOGY REVIEW

Vol. 35, No. 7



April, 1933

Slum Clearance

A Plan for the Adequate Housing of Poor People

BY ROSS F. TUCKER

AGITATION for more and better housing has resulted in but little except to make generally known that the poorest people are frequently compelled to live on the most expensive land in our cities and that a great portion of the population of this country are unable to rent or buy a new house. Much criticism has been directed at the building industry as being responsible for this condition, whereas as a matter of fact, the building industry is much less to blame than the system of economics which has dominated all of our housing development and which has permitted unrestrained private initiative to exploit the people for speculative gain. As a result, we find most of our cities badly planned, seriously congested, reeking with slums, spotted with blighted areas and shifting their business and residential centers from place to place to escape the consequences of the failure of the community itself to plan its own destiny or adequately to provide for its own growth and development.

Students of the housing problem are divided into two schools of thought, one of which maintains that the solution of better housing for those in the lower income group lies in some form of state subsidy, wherein the community will assume a part of the economic load. This is merely a device to tax one section of the people to promote the welfare of another section not so fortunate, and, except for those in the very lowest income group, for whom no other solution is to be found, such

IT IS TIME FOR THE ENGINEER-ECONOMIST TO TAKE CONTROL OF HOUSING IF THERE IS TO BE ANY AMELIORATION OF THE INTOLERABLE CHAOS NOW PREVAILING

a plan is socially unsound. The other school seeks to find the answer in multiple housing, wherein speculative costs are to a certain extent curtailed by limiting dividends and the economies of large scale production are invoked to soften the ultimate rental price. Both of these proposals, however, persist in accepting a fundamentally unsound premise which is that people in the lower income groups must continue to live on expensive land. If the burden of ten dollar land or even of two dollar land must first be loaded upon people of small incomes, it is manifest that only by repeating and perpetuating all of the evils of over-crowding can any satisfactory housing be provided and then only for those in the relatively higher income brackets. It has been shown that no family in the lower income groups should spend more than 20% of its income for rent, and it has been shown also by repeated housing experiments that the best that can be expected of multiple housing, in which the conditions of light and sanitation and density of population are satisfactorily solved, is a rental of ten dollars per room. Thus on a basis of four rooms, or forty dollars per month, such housing would be available only to families having an income of \$2400 a year — which means that over two thirds of the people would still be unable to rent them.

The principle of multiple housing is wrong in any event, and its only justification lies in the necessity of crowding more people onto the land in order to distribute

the cost of the land over a greater number. Multiple housing means congestion. It limits the tenant to the confines of his own apartment. He has no freedom of movement. His light and air are the little that the placement of his rooms and the number of his windows afford. He has no place to go, except into the street or perhaps into the court if there is one. With the increased leisure that the shorter working day will bring, he will seek recreation and companionship where it can be found, which, as likely as not will be in the corner saloon, or in its equivalent which may not be so conspicuously conducted.

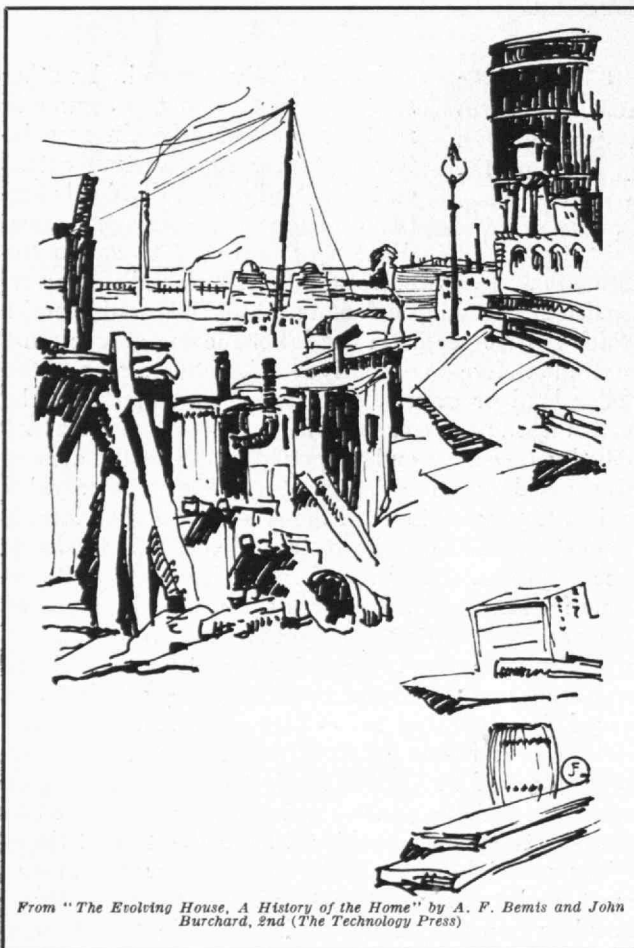
The key to the problem of slum clearance lies in the creation of a low cost house built on low cost land under a financial plan that will eliminate the grotesque speculative costs that have hitherto characterized all of our dwelling house construction. It has been estimated by some investigators that, roughly speaking, the cost of a house is divisible into four parts, namely, one quarter for land, one quarter for labor, one quarter for materials and one quarter for financing.

The value of the land that the home-owner buys is a speculative value, built up by realty promoters to ensnare the unwary. The vociferous farmer has the country all on edge because of his nine billion dollars of farm mortgages but the inarticulate home owner is carrying a burden of nearly three times as much in suburban mortgages with such patience and fortitude as he may, and a large part of this indebtedness has been

manufactured for him by those who have had a hand in the financial legerdemain by which he acquired his home. For example, a farm is bought, with a payment down and the balance deferred in a purchase money mortgage. The land is subdivided into small lots, streets and sidewalks are constructed, trees are planted, water, gas and electric services are installed, the costs of all of which are charged back to the salable areas. On top of this an expensive sales organization is imposed and again, on top of this, the largest profit that the traffic will bear. Meanwhile, the town, county and state change the rate of assessment for taxes, from farm land to improved land, and these also are handed over, carefully concealed in the price that the purchaser is asked to pay. High powered advertising, shrewd and unscrupulous agents and brokers, baiting the trap with the lure of easy and deferred payment, and further speculative profits, snare the home owner into taking title. Or further to facilitate the sale of the land, the speculative builder is taken into partnership. His function is to build flimsy but superficially attractive houses, in which the arts of stage setting and window dressing are developed at the expense of the substance of the house. The home is then offered for sale at a price that gives the speculative builder a profit out of all proportion to the real value, and also one for which he has risked little or none of his own money. The sale is facilitated by another financial snare in which the mortgage with its deadly tentacles carefully concealed, plays an inconspicuous but often fatal part. Thus the home buyer takes title with a millstone hung around his neck, at a total cost far above the real value of his home. The original land owner, the promoter, the speculative builder and the money lender have each taken a toll as large as each could exact, and the pyramiding of these costs results in a condition that puts the purchase of a home beyond the reach of any with an income of less than \$2300 a year. This is the condition of which our critics complain, and with complete justification.

THE solution for the problem of the adequate housing of people in the middle and lower thirds of the annual income group, that is to say, of people with incomes of less than \$2300 a year, lies in a total revision of our ideas as to the development of real property and a complete change from a speculative basis to an investment basis for land and house values, or in other words, in the restraining of private initiative in the interest of the people for whom heretofore private initiative has done nothing, except to condemn them to live in second-hand and third-hand and fourth-hand houses that have been abandoned by those whom private initiative has already exploited.

The first thing to be done is to set up a Planning Authority. Just as the Port of New York Authority has been established to govern and regulate the economic development of New York Harbor, and just as a Power Authority has been created to control the development of hydroelectric power in the interest of the people, so should there be a Planning Authority endowed with like power to guide and direct the growth of all towns and cities. The Port Authority, representing the sovereign will of the People, restrains private initiative in the



From "The Evolving House, A History of the Home" by A. F. Bemis and John Burchard, 2nd (The Technology Press)

interest of the general good. Likewise should a Planning Authority, exercising its powers through the right of eminent domain or condemnation set aside selected areas of low priced land for the future development of housing areas.

Housing Commissions and Planning Boards have already been set up in many states, with advisory powers and limited authority with which to attack a tremendously important economic problem. These are the first feeble attempts, beyond zoning laws and building codes, of the community to take command of its own destiny. It must do much more. It must set up a Planning Authority in every county or in groups of counties to study and control their economic development. The Planning Authority should be a board of the best technical minds available, removed from politics and permanent. It should make a complete economic study of the future development of the community over which it presides, not for two years or five years, but for ten years or 20 years or 50 years. It should have powers to control and direct the movements of populations. It should determine the real value of land, and by condemnation or otherwise set aside areas for housing for the several income groups. It should take control of the growth of cities and, as they are rebuilt, make provision for their orderly planning and development to meet the conditions of the age. It should study taxation, appraisal, assessment and the cost of government and bring these into scientific balance with the real value of land.

It is time for the engineer-economist to take control and to try to bring some intelligence to bear upon the economic mess in which real property finds itself and to bring some stability into values which now are based only on what the traffic will bear. There will be no doubt, a great hue and cry from those who have heretofore profited by these conditions, and who would like to perpetuate them in their own interest. But what of the slums and blighted areas? What of the ten billion dollars of real estate bonds that are today in default? What of the congestion, the inconvenience, and the human wear and tear that lack of forethought and control permit to worry and vex all concerned. It is unintelligent and unnecessary and it is rapidly becoming intolerable.

The second step in our plan for the housing of poor people is the production of a low-cost house, and to this end many studies and investigations are being made. We are not so much concerned at the moment with the revision of the materials and methods at present employed in dwelling house construction as we are in the creation of an entirely new method that will so far reduce costs as to provide suitable housing for the large section of our people who hitherto have been unable to buy or rent a new house. Such a system of construction would immediately tap a huge reservoir of building heretofore entirely untouched and would supply a new market of labor, materials and appurtenances of vast dimensions. (Such a system of construction is being developed by the author at M. I. T.)

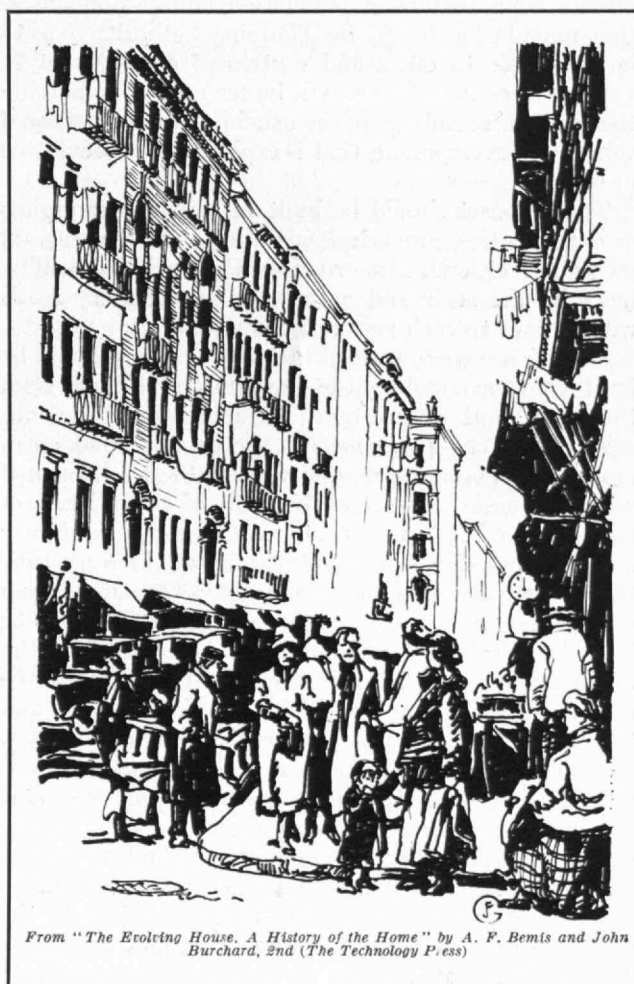
Under the stimulus of the demand for cheaper housing, various schemes are being brought forward employing materials of various kinds but most of these lack elasticity and provide only for houses of a single type or a few slightly varying types.

People like to be inconsistent. They have no objection at all to owning a car that is an exact duplicate of their neighbors', but ask them to live in a house that even remotely resembles their neighbors' and they will decline with scorn. Unfortunately, some builders have been guilty of doing just that thing and have cluttered up the landscape with rows of monotonous eyesores that are an abomination to any community that is afflicted with them. That, however, is the evil of unrestrained private initiative which finds expression on a much grander scale in all of our cities.

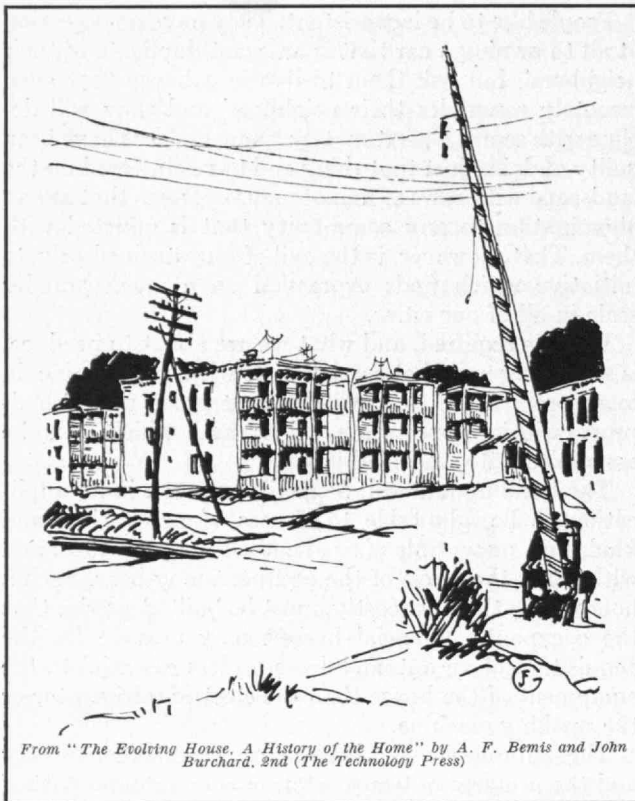
What is required, and what we are about to produce, is a building unit that can be made with the machine, in mass production, that will be heat-proof and sound-proof within appropriate limits and which can be assembled with unskilled labor.

The building unit will be flexible enough in its application to be adaptable to houses of many sizes and kinds and susceptible of such embellishment within and without as the purse of the occupant may bear. Such a house, even the least costly, must be built at a price that the occupant's financial budget may provide for the acquisition of an automobile as no less essential to the equipment of the house than the electric refrigerator or the washing machine.

The automobile has become an economic necessity and the problem of transportation is an integral part of the problem of home building. As these houses will be



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built upon cheap land, they will generally be more or less remote from centers of population and consequently, they must be located by the Planning Authority so as to be accessible to cities and centers of employment in various directions. There will be no need to subdivide the land nor to indulge in the usual luxuries of the usual suburban development, that is exploited for speculative profit.

These houses should be built in picturesque groups or communities, properly landscaped and each with its own quota of land. Main roads or thoroughfares will be built by the state and only lanes or secondary roads will be built to each group or community.

Neither are we concerned that these houses should be built from the standpoint of permanency but only from the standpoint of resistance to depreciation and obsolescence. Why permanency? We do not build automobiles for permanency, and we could not sell them if we did. These houses may be built of many kinds of materials and in a way that permits not only of easy assembly but of easy disassembly, and, at the same time their construction will be so efficient, as to surpass any construction now in use to the extent that they may be heated by electricity, thus eliminating the basement, the heating plant and the chimney. Their cost should be amortized within the limit of their economic life and then they may be removed and replaced by new houses.

Much is being heard of steel frames and metal houses, and in these a solution may be found, but the fatal weakness of all metal is corrosion and no metal house can be expected to last indefinitely. That very fact compels its amortization within its economic life and to that extent it offers an important contribution to the solution of the problem of the low cost house, because it opens the way for the employment of many new

materials, it supplies opportunity for new architectural conceptions, it makes use of the machine, and introduces the economies of mass production. Again the capabilities of wood are far from being exhausted, and new forms of construction are being devised that will revolutionize the outmoded methods to which we have so long been accustomed. Here too, the machine will play its part, in eliminating, to a maximum extent, the slow and expensive processes of hand labor with its wasteful fitting and sawing and cutting.

The third step is the setting up of a financial structure that will be based on sound economics instead of speculative profits, and which will combine investment with insurance, in such a way that the home owner becomes interested in the community rather than in the house itself that he lives in. The principle lies in centralized control rather than in individual ownership. The home owner purchases a share in the whole and receives the protection of the whole, with none of the burden of financial management that the ownership of property in fee entails, and of which many of the people of this income group are wholly incapable. All that the home owner does is to pay in a stated stipulated sum in cash and a further stipulated sum each month, proportionate to his income and in accordance with the accepted budgetary scale.

THE control of the community is centered in the investment foundation upon which the community is built and the accumulated excess over interest, upkeep and amortization and insurance accrues to the home owner as an invested dividend, a form of compulsory saving that he may, under certain circumstances and after a certain time withdraw. Group insurance against death or disability, and to a certain extent, against unemployment, safeguards the owner against the loss of his home except in extreme circumstances, and then only after the exhaustion of his accumulated dividend.

Such a community must of necessity be a sound investment, founded as it is upon real property, and supported by all of the participants in accordance with a predetermined fixed scale of charges, any excess of which reinforces the investment while accruing to the credit of the participant. He pays for all that he gets. No contribution is made to him in any way. It is not altruistic or socialistic or paternalistic or is it subject to any of the whims or weaknesses of human nature. It deals only in real values and has for its objective only the financial welfare of the group, while at the same time, it lifts from the individual the management and control of his property for which he has, as a rule, no experience or capacity, yet leaves to him all of the advantages and the freedom and independence that is usually enjoyed by the owner in fee.

These houses must be homes and not hovels. They must be durable, and fireproof, and sanitary. They must be attractive and they must have a setting that will lend them beauty and charm. They must in themselves build up the morale of the dwellers therein and make them proud of their environment, of their country and of themselves. Here physical, moral, and spiritual health may flourish and here may good citizens be bred instead of tuberculosis and vermin and gangsters.

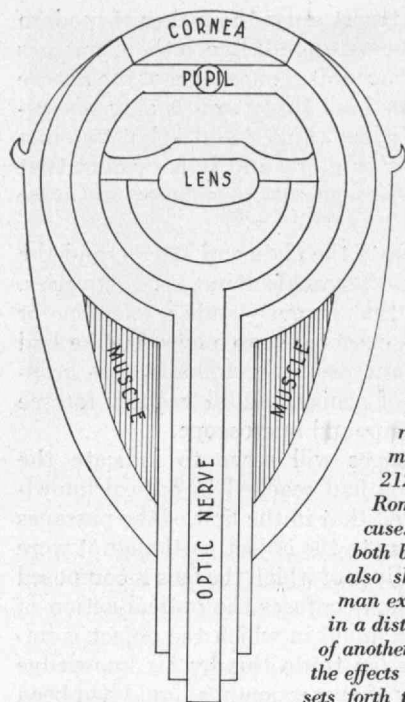


Fig. 1 (left)
The eye according to Alhazen. Redrawn from a manuscript of the Thirteenth Century in the Library of the Royal Observatory at Edinburgh

Fig. 2 (right)
From a Latin edition (1572) of Alhazen. It illustrates contemporary belief as to the behavior of light. The main scene represents the use by Archimedes of concave mirrors in 212 B.C. to set fire to the Roman ships attacking Syracuse. A rainbow with clouds both behind and in front of it is also shown. In the foreground a man examines his displaced image in a distorting mirror, while the legs of another, standing in water, exhibit the effects of refraction. A long bridge sets forth the principle of perspective



The Advent of the Lens

When Did Spectacles First Come into Use?

BY CHARLES SINGER

LENSES, in our sense of the word, were unknown to the ancients. Repeated statements to the contrary are constantly made but are always based on misunderstandings. The most famous case is that of the Emperor Nero who had defective sight which he aided by means of an emerald set in a ring. The jewel acted, however, as a mirror and not as a lens. Burning-glasses, on the other hand, were quite familiar in antiquity. The use of such a glass is mentioned by the playwright Aristophanes who died in 385 B.C. It is not unlikely, moreover, that spheres of glass filled with water were used as magnifiers by the gem cutters of antiquity, whose work could hardly have been accomplished without some aid to vision. Pliny mentions that burning-glasses were used by physicians as cauteries.

"Letters, however small and dim," says Seneca (c. A. D. 63), "are comparatively large and distinct when seen through a glass globe filled with water."

The general principles of reflection with some idea of the refraction of light, and notably the optical properties of curved mirrors, were comprehended by Euclid (or at least by a writer using his name) in the Third Century B.C. as well as by the mathematician Ptolemy in the Second Century A. D. The optical views of antiquity were, however, always vitiated by the theory that in the act of vision something emanated from the eye, a view derived from the philosopher Plato.

The fall of Greek science was followed — after a long interval — by the rise of the Arabian system which was based on it. The earlier Arabian optical writers were

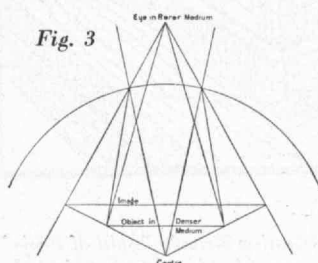


Diagram by Roger Bacon to illustrate optics of plano-convex lens

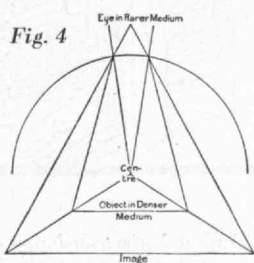


Diagram by Roger Bacon to illustrate optics of plano-convex lens

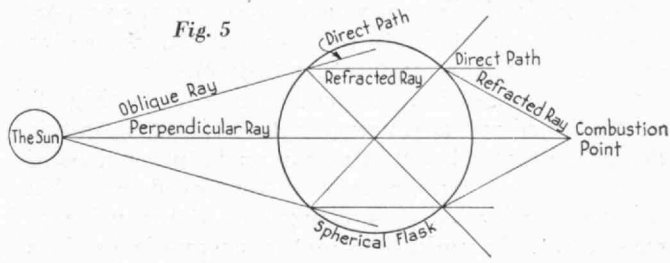


Diagram by Roger Bacon to illustrate optics of burning-glass or spherical flask filled with water



Fig. 6

Roger Bacon from a manuscript written in northern France about 1450 and now in the Bodleian Library at Oxford. Roger sits in contemplation before his cell, book and pen by his side. An assistant holds up to the light a flask such as that with which Roger made his optical experiments on the sun's rays. From an upper window, another is making observations with a sextant

concerned only with the translation and codification of Greek works of science. More important for our purposes are certain later Arabian philosophers who were led to abandon the Platonic theory of emanation and were thus in a better position to appreciate the nature of the eye. The most important of these was Alhazen.

Alhazen (Hasan ibn al Hasan ibn al Haitham, Abu Ali, 965–1038) was an Arab of Basra, who abstracted the work of the older Greek optical writers but exhibited some originality. He devoted much space and skill to the development of the optical effects of curved mirrors. He had a fairly clear notion of the nature of refraction, and improved the apparatus of Ptolemy for measuring the angle of refraction in different media. As regards his knowledge of the structure of the eye, not only was his ophthalmic anatomy better than that of most of his predecessors, but he considered that vision resulted from rays coming to the eye from the object, and opposed the view, current up to the Eighteenth Century, that explained vision as involving the emanation of something from the eye. He placed the lens or *humor crystallinus* in the center of the globe of the eye (Fig. 1), and considered that in it the external impulse became converted into the sensation of vision. He speaks also of the enlarging power of a segment of a sphere of glass. The optical work of Alhazen, which is of enormous proportions, was translated into Latin by an unknown writer of the early Thirteenth Century (Fig. 2).

The Franciscan friar, Roger Bacon (1214–94, Fig. 6) accomplished real advances in optics. His work, in this department, was based primarily on Latin versions of Alhazen. Bacon is, however, distinguished from his predecessors by his clear conception of the value of experiment. His works show that, having made a serious and continued effort to discover the laws of refraction and reflection, he sought to apply his knowledge to the improvement of the power of vision. In this he is a real

pioneer, and is in the truest sense the father of modern optics. Moreover, in the writings of Bacon there emerges a clearer though still inaccurate conception of the nature of a lens. He seems to think that there is only one refraction in the case of a lens (Figs. 3 and 4) but two in a spherical burning-glass (Fig. 5), and it is evident that the lenses he used were segments of spheres and were thus plano-convex.

It is easy to exaggerate the claims of Bacon, and the wildest statements are often made about his discoveries. There is no evidence that he ever made a telescope or any optical apparatus except a simple lens, but he had an idea of the nature and property of lenses, and, groping with the instinct of genius, he did vaguely foresee both telescope and compound microscope.

The following passages will serve to indicate the stage that Roger Bacon had reached in optical knowledge. It will be observed that in the first of the passages Bacon figures and refers to the object as though it were itself in the denser medium of which the lens is composed (Figs. 3 and 4). He thus confuses the optical action of the lens with that of a liquid in which the object is immersed. Perhaps he is led to do this by his knowledge that the optical results of immersion in a liquid had been investigated by his predecessors, or perhaps by their descriptions of the process of vision as taking place



Fig. 7

From a Latin translation of Sebastian Brant's "Ship of Fools" printed at Basel in 1498. The learned fool is reading at his desk, surrounded by books, with his spectacles on his nose and a fly-whisk absent mindedly held upright. This is one of the earliest representations of spectacles in a printed book



Fig. 8

Woodcarving of the Fifteenth Century from a church at Rothenburg on the Taube. St. Peter is shown with spectacles, reading a book

within the supposed central crystalline sphere of the eye (Fig. 1). It is also apparent that he does not realize the refractive action of the plane surface of his plano-convex lenses.

"If any one examine letters or other minute objects through the medium of crystal or glass or other transparent substance, if it be shaped like the lesser segment of a sphere, with the convex side towards the eye, and the eye being in the air (Fig. 3), he will see the letters far better, and they will seem larger to him. For the centre [of the lens] is beyond the object, the convexity being towards the eye, all causes agree to increase the size, for the angle in which it is seen is greater, the image is greater, and the position of the image is nearer, because the object is between the eye and the centre. For this reason, such an instrument is useful to old persons and to those with weak eyes, for they can see any letter, however small, if magnified enough. But if a larger segment of a sphere be employed (Fig. 4), then the size of the angle is increased, and also the size of the image, though propinquity is lost since the image is beyond the object, and the centre of the sphere is between the eye and the object seen. Therefore such an instrument is not so useful as the smaller segment."

His optical theory is obviously at fault but he is reaching out toward our modern standpoint. Elsewhere he tells us that. — "As to double refraction, we can verify many of its phenomena by experiment. For if one hold a crystal ball or a round flask filled with water in the rays of the sun, he will find a point at



Fig. 9

Portrait detail from a picture at Antwerp by Jan van Eyck. It was painted about 1425 and is the earliest important work of art exhibiting spectacles

which, if any easily combustible substance be placed, it will catch fire. This would be impossible unless we suppose a double refraction. For a ray of the sun coming from a point in the sun through the centre of the flask is not refracted, because it falls perpendicularly on flask, water, and air, passing through the centre of each. . . . But all the (other) rays are necessarily refracted in the flask, because they fall at oblique angles. . . . Now, since an infinite number of rays are given off from the same point of the sun, and only one falls perpendicularly on the flask, all the others are refracted and meet at one point on the perpendicular ray which is given off along with them from the sun, and this point is the point of combustion. . . . This concentration would not take place except by double refraction, as shown in the diagram" (Fig. 5).

Roger Bacon's prophecies of the scientific developments (Concluded on page 262)

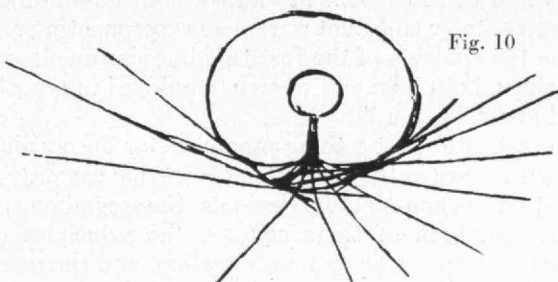


Fig. 10

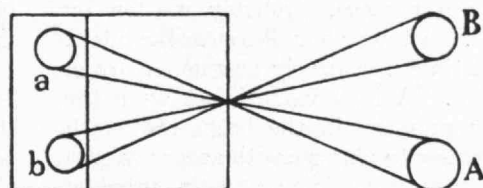


Fig. 11

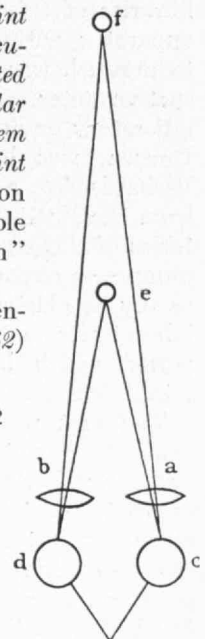


Fig. 12

Fig. 10 is a diagram of the eye from Leonardo da Vinci, showing the sphaera crystallina, the supposed seat of vision in the center of the globe. Fig. 11 is a diagram by Leonardo da Vinci of the action of a pinhole camera obscura. A and B are external objects and a and b their images formed on the back wall of the camera. Leonardo compares the action of the eye to such a camera. Fig. 12 is a diagram by Leonardo da Vinci to illustrate the action of convex spectacle lenses; c and d are the two eyes; a and b the two spectacle lenses. He thinks the difficulty of vision is eased by making the object appear farther off, as from e to f, and thus lessening the need for converging the two eyes

An evening chemistry class of the Lowell Institute in the laboratory of the Massachusetts Institute of Technology, 1869. Reproduced from the Supplement to FRANK LESLIE'S ILLUSTRATED NEWSPAPER, December 18, 1869. The professor in the left foreground



is Charles W. Eliot. "On winter evenings these rooms present a scene of unusual interest, for it is then that female students are given the use of the desks and apparatus." The Institute is now co-educational, about 1% of all the students being women

Chemistry at M.I.T.

A History of the Department from 1865–1933

BY TENNEY L. DAVIS

THE Massachusetts Institute of Technology opened in 1865. This was the year in which Berthelot began his classic researches in thermochemistry, the year after the *Bulletin de la Société chimique de France* commenced publication, and three years before the *Berichte der Deutschen Chemischen Gesellschaft* made its first appearance. The American Chemical Society was founded 11 years later. Chemistry and chemistry instruction have changed greatly since those days. There were then no textbooks designed for laboratory use. Abstract journals and comprehensive libraries of reference did not exist, and much of the apparatus, without which we would now find it difficult to proceed, was then unknown. The water pump and suction filter, for example, were not yet standard laboratory equipment. The water pump, invented by Bunsen, was later improved by Robert Hallowell Richards, '68, a member of the first class to graduate from the Institute, and became familiar in the laboratories of this country under the name of the Richards pump — a circumstance which serves, perhaps as well as any, to illustrate the changes which have occurred in laboratories and in laboratory instruction during the period which has elapsed since the Institute was established.

The first printed catalog of the Institute, dated 1865–1866, contains a passage, probably written by Professor Charles W. Eliot, which makes clear the intent of what was at that time a relatively new departure in chemistry instruction. "A high value is set upon the effect of laboratory practice, in the belief that such practice trains the senses to observe with accuracy, and the judgment to rely with confidence on the proof of actual experiment." The Institute opened on the principle that each student should experiment for himself in the laboratory. In due time it became apparent that another principle was also at work — that the teaching of the art of research is to be accomplished

by the practice of it. By these two principles the history of the Institute's Chemistry Department is explained and summarized.

In February, 1865, the Institute opened its preliminary course and held its first classes in a building at 16 Summer Street, Boston, about opposite the present location of C. F. Hovey and Co. There were 15 students and six professors. Francis H. Storer had charge of chemistry. When the fall term opened in October, the number of the Faculty had been increased to ten. There were two chemists: Storer was Professor of General and Industrial Chemistry, and Charles W. Eliot was Professor of Analytical Chemistry and Metallurgy. Both of these men had attended the first classes and had been assistants in the first laboratory courses of Josiah Parsons Cooke, Jr., who had introduced regular laboratory instruction in chemistry for undergraduates of Harvard College in 1858. "These two young professors," as Eliot later wrote, "were soon called on to plan and equip the chemical laboratories in the Institute's new building on Boylston Street. These laboratories were planned for teaching chemistry to all students, young or old, beginners or adepts, by the laboratory method. In these convenient and spacious laboratories Professors Storer and Eliot were soon experimenting not only on the students of the Institute but also on classes of teachers, both men and women, employed in schools in and about Boston."

The Institute's first catalog announces for the opening year two courses in the elements of inorganic chemistry, the first on the non-metallic elements, the second on the metals. "In both of these courses, the principles of chemical nomenclature and classification, and the more striking facts in the history of the elements and the present state of chemical theory, will be dwelt upon at such length as is consistent with the general character of the lectures; but special attention will always be given to those substances and processes which are of

importance in common life or in the useful arts. Practical instruction in chemical manipulations will also be given in the laboratory to every student. This series of lessons will include practice in the construction and use of apparatus for preparing and experimenting with the common gases, acids, bases, salts, etc., which have been described in the lectures." The catalog also announces a course in qualitative analysis for the second year, courses in industrial chemistry including mineralogy and metallurgy for the third and fourth years, and evening classes at the Lowell Institute "open to students of either sex, free of charge—A Course of Eighteen Lectures on the Chemistry of the Non-Metallic Elements, by Prof. Storer, on Mondays and Fridays, at 7½ P.M.—A Course of Eighteen Lectures on the Chemistry of the Metals, by Prof. Eliot—Beginning when Prof. Storer's course closes." In the following year, 1866–1867, the two professors gave at the Lowell Institute a course of "Thirty Practical Lessons in Chemical Manipulations."

The second catalog shows that the Chemistry Department had expanded. Cyrus M. Warren, pioneer in the industrial development of coal tar, had been appointed Professor of Organic Chemistry and gave a course of lectures in that subject which followed the qualitative analysis of the second year. Quantitative analysis was given in the third year, and lectures on industrial chemistry and descriptive and determinative mineralogy; in the fourth year more quantitative analysis, the preparation of chemical products, and special researches. In describing the first year chemistry the catalog says, "In his laboratory work, the student will use a text-book, in which all needed directions to secure safety and success in performing the experiments are minutely given." This was the famous textbook of Eliot and Storer, "A Manual of Inorganic Chemistry Arranged to Facilitate the Experimental Demonstration of the Facts and Principles of the Science."

Eliot and Storer's "Manual" was the first book of its kind in the English language, perhaps the first in any language designed for the use of students who should carry out the experiments themselves. After the manuscript had been put in type, the authors used the proof sheets in their classes for a year and in this way were able to discover certain errors and defects and to make improvements in the revised edition. Their "Compendious Manual of Qualitative Chemical Analysis" was first used, in the proof sheets, by the second year class in the fall of 1868. Both works appeared in later revised editions and remained standard texts until about the end of the nineteenth century.

In 1869 Eliot left the Institute to become President of Harvard University. Storer followed him to Harvard a year later and became Professor of Agricultural Chemistry and, in 1871, Dean of the Bussey Institution, and continued in both positions until his retirement in 1907.

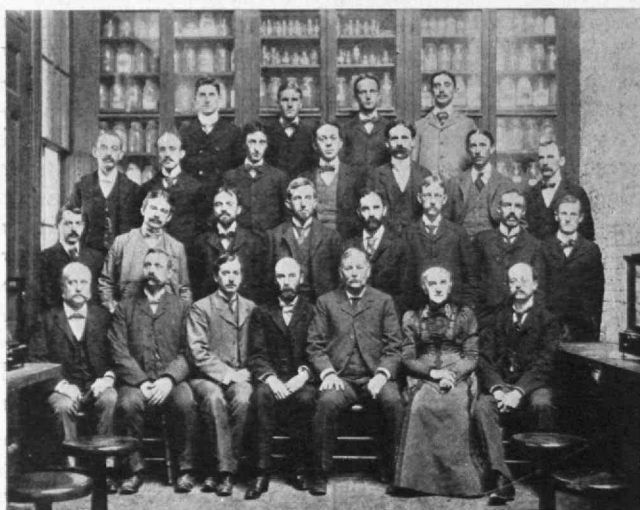
The first class to graduate from the Institute, in 1868, consisted of 14 students, none of them graduating in chemistry, six in civil engineering, one in general science, one in mechanical engineering, and six in mining engineering and metallurgy, but the latter had received a considerable portion of their training in the Department

of Chemistry. One of them, Robert Hallowell Richards, remained at the Institute as Assistant in General Chemistry, 1868–1869, Instructor in Assaying and Qualitative Analysis, 1869–1870, and Assistant Professor of Analytical Chemistry, 1870–1871. In 1871 he left the Chemistry Department to take charge of the mining and metallurgy laboratory, and from 1873–1914 was head of the Mining Department. His long and distinguished career is well known, and his work on "Ore Dressing" is a classic. His wife, Ellen H. Swallow Richards, '73, was a member of the Chemistry Department from 1878 until her death in 1911. She had received the A.B. degree from Vassar College in 1870, and was awarded both the Vassar A.M. and the Institute's Bachelor of Science degree in 1873. She served for a few years as private assistant to Professor William Ripley Nichols, '69, and then became the first, and for many years the only, woman instructor at the Institute. With the support of President Runkle and a few members of the Faculty, against the rest of the Faculty and the unanimous opposition of the Corporation, she succeeded in opening the Institute to women students. As James



The first and second editions, 1867 and 1868, of Eliot and Storer's "Manual of Inorganic Chemistry." Note the E and S monogram on the back of the first edition, arranged in such a way that it is impossible to know which letter ought to be read first; and note the way in which the names are crossed on the back of the second edition in such manner that neither appears before the other. The story goes that each co-author wished the other's name to stand first on the title page. A penny was flipped, and Storer claimed that Eliot won. Eliot's name does stand first on the title page, but not above the name of Storer—for both names are printed on the same line

Phinney Munroe, '82, described the matter while speaking at the dedication of the bronze memorial to Mrs. Richards in the hallway of the Institute, the "cautious and reluctant authorities placed her and her small band of disciples in a sort of contagious ward located in what we students used to call the 'dump' and known as the Women's Laboratory." Since that time



Staff of the Chemistry Department, 1899-1900. Front row, seated, left to right: John Smith, Fred L. Bardwell, '84, Arthur A. Noyes, '86, Henry P. Talbot, '85, Thomas E. Pope, '71, Ellen H. S. Richards, '73, Augustus H. Gill, '84. Second row, standing: George W. Rolfe, '95, William H. Walker, Willis R. Whitney, '90, Forris J. Moore, Frank H. Thorp, '89, Samuel P. Mulliken, '87, L. Kimball Russell, '86, Lewis P. Chapin. Third row: Alpheus G. Woodman, '97, William T. Hall, '95, Henry Fay, James F. Norris, Oscar W. Pickering, '89, Joseph W. Phelan, '94, Peter Burns. Last row: Fred E. Busby, '97, Miles S. Sherrill, '99, Arthur A. Blanchard, '98, Lewis J. Seidensticker, '98

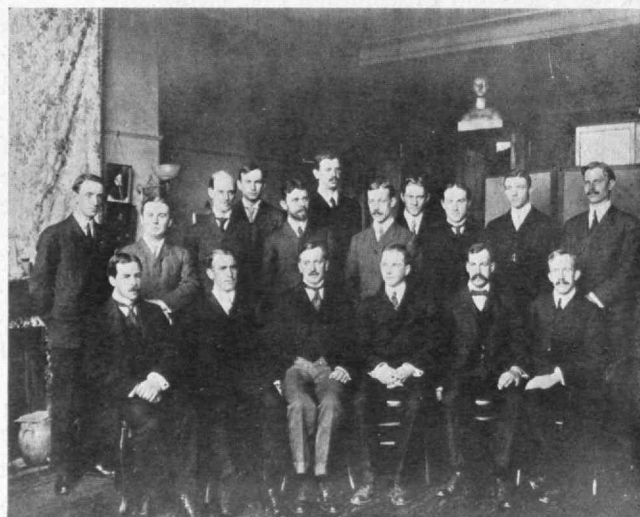
conditions have improved, and women are now admitted to any courses at the Institute in the same manner as men students. Mrs. Richards was a pioneer in sanitary chemistry and in the chemical analysis of drinking water. She did much to make public schools more hygienic, and promoted and brought about legislation which tended to remove the schools from the control of the politicians. She helped in the organization of the home economics movement and was the first president of the American Home Economics Association.

The class which graduated in 1869 consisted of five students. One of them, William Ripley Nichols, remained at the Institute serving for a year as Instructor in Determinative Mineralogy and General Chemistry, then as Assistant Professor of General Chemistry from 1870 to 1872, and as Professor from 1872 until his death in 1886 in the fortieth year of his age. Immediately after graduating from the Institute, he associated himself with the Massachusetts State Board of Health for the investigation of a variety of sanitary problems, in particular those relating to water supply and sewerage, and it was in this field that his most important contributions were made. A paper "On the Filtration of Potable Water" which first appeared in the *Reports of the Massachusetts State Board of Health*, 9, 137-236 (1878), was published separately as a volume of 93

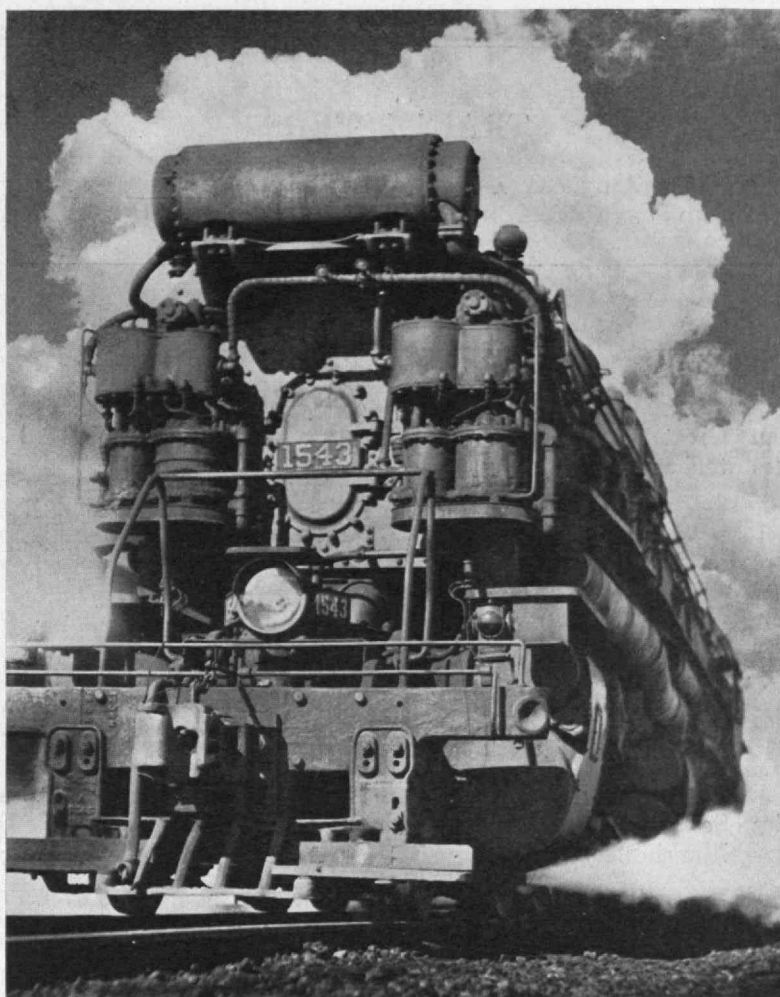
pages by Van Nostrand, New York, 1879. Nichols' "Water Supply, mainly from a Chemical and Sanitary Standpoint" was published by Wiley & Son, New York, 1883. In addition to his other duties, Nichols prepared and issued revisions of Eliot and Storer's two textbooks, adding new material on organic chemistry, and did much of the work which was necessary, translating, indexing, revising of proof, etc., in connection with the edition of the complete works of Count Rumford which was published in 1875 by the American Academy of Arts and Sciences. His books, left to the Institute, constituted the nucleus of the William Ripley Nichols Chemical Library which was housed in a pleasant room on the second floor of the Walker Building, at the corner of Boylston and Clarendon Streets in Boston. When the Institute moved to its present building in Cambridge, the books were distributed in the central library under the dome. Many of them are now in the special library of the George Eastman Research Laboratories of Physics and Chemistry.

The third class to graduate from the Institute, 1870, numbered ten students, one a chemist, N. Frederick Merrill, who later became Professor of Chemistry at the University of Vermont. There were two chemists among the 17 students who graduated in 1871, three among 12 in 1872, and seven among 26 in 1873.

John Morse Ordway was Professor of Metallurgy and Industrial Chemistry from 1869 to 1884. He had graduated from Dartmouth College in 1844 and had had a rich and varied experience in the manufacture of chemical products with the Lowell Chemical Works, the Roxbury Color and Chemical Co., the Drybrook Chemical Works, and as Superintendent of the Manchester Print Works. About 1871 he designed and constructed furnaces for assaying, smelting, and refining metals, in which the operations could be carried out in the laboratories of the Institute on such a (*Continued on page 264*)



Students and Staff of the Research Laboratory of Physical Chemistry, 1905-1906. Standing, left to right: Roy D. Mailey, '04, Charles Field, 3rd, '05, George A. Abbott, '08, Richard C. Tolman, '03, Charles A. Kraus, '08, Clarence W. Kanolt, William C. Bray, Guy W. Eastman, '04, Morris A. Stewart, '07, Robert B. Sosman, '04, Edward W. Washburn, '05. Seated: Gilbert N. Lewis, Miles S. Sherrill, '99, Arthur A. Noyes, '86, Harry M. Goodwin, '90, Arthur C. Melcher, '00, Raymond Haskell, '03



"The keen unpassioned beauty of a great machine." A locomotive on the C. & O. used for pulling freight over the Blue Ridge Mountains

Rittase

Record Train Speeds

Further Data on Crack Railroad Flyers at Home and Abroad

BY THE REVIEW STAFF

COMPARING scheduled speeds of crack railroad flyers seemingly forms an absorbing pastime for many readers of The Review if one may base an opinion on the letters prompted by the publication in February, 1931, of a "Table of Representative Fast Railroad Runs Between Metropolitan Centers in the United States and Canada." This correspondence has been revived by the caption on the frontispiece of the recent January, 1933, number which stated that the "Table" had been brought up to date and showed that the combined average speed of the fastest services on the 30 runs had declined 0.4 of 1% during the two years which had elapsed since the making of the original compilation.

While expressing interest in the highest average rates of railway travel available between large cities, the letters have often raised the question as to which regularly scheduled train makes the *fastest average speed between two scheduled points spaced at reasonable distances apart*, either with or without intermediate stops. Most

recently, a subscriber in Ottawa has nominated Canadian Pacific's *Royal York* for the honor because it covers the 124 miles between Smith Falls and Montreal West in 108 minutes, or at an average of 68.8 miles per hour. This claim appears to be entirely justified except for the *Cheltenham Flyer* of the Great Western (England). Two years ago, the *Cheltenham Flyer* averaged 66.3 miles per hour for its run of less than 100 miles between Swindon and Paddington but it has since been stepped up to 71.3.

Verification of the claim advanced for the *Royal York* has led to the unearthing of further data on the fastest trains at various longer distances, and also the fastest trains in various countries. Some of the results appear on the following page. The Review would welcome citations as to discrepancies in the tabulation, for even a most meticulous (as well as a truly exhausting) perusal of American and European time-tables is susceptible to an oversight, and its yield may not safely be submitted without reservations.

TRAIN SPEEDS

COMPARATIVE SPEEDS OF TEN AMERICAN AND FOREIGN TRAINS WHICH MAKE THE FASTEST AVERAGE BETWEEN TWO SCHEDULED POINTS SPACED AT REASONABLE DISTANCES APART

Identification Number	Group	Railroad and Train	Between	Time, Mileage, and Average Speed			Remarks
				Mins.	Miles M.P.H.		
1	Less than 100 miles	Great Western, Chel- tenham Flyer	Swindon- Paddington	65	77.3	71.3	Non-stop
2	100 to 125 miles	Canadian Pacific, Royal York	Smith Falls- Montreal West	108	124.0	68.8	Non-stop
3	125 to 150 miles	Nord, (10.10 a.m.)	Paris- Jeumont	134	147.7	66.1	Non-stop
4	150 to 175 miles	London, Midland & Scottish (5:25 p.m. Liverpool)	Crowe- Willesden Jct.	142	152.7	64.5	Non-stop
5	175 to 200 miles	London, Midland & Scottish (9:45 a.m. Manchester)	Wilmslow- Euston	172	176.9	61.7	Non-stop
6	200 to 250 miles	Pennsylvania, Liberty Ltd. and Golden Arrow	Gary- Crestline	255	254.5	59.9	2 scheduled and one flag stop
7	250 to 500 miles	Canadian National, Inter-City Ltd.	Toronto- Montreal	360	334.0	55.6	5 scheduled stops
8	500 to 1000 miles	N. Y. Central, 20th Century	New York- Chicago	18 hrs.	961	53.4	
9	1000 to 2000 miles	B. & A., N. Y. Central, 20th Century	Boston- Chicago	20.5	1019	49.7	
10	Over 2000	Northern Pacific, North Coast Ltd.	Portland- Chicago	57.5	2316	40.3	

FASTEST TRAINS IN VARIOUS FOREIGN COUNTRIES

			Miles M.P.H.
Fastest English train	Great Western	from Swindon to Paddington	77.3 71.3
Fastest Scottish train	London, Midland & Scottish	from Thornhill to Dumfries	14.2 53.3
Fastest Irish train	Great Northern (Ireland)	from Dublin to Drogheda	54.3 60.3
Fastest Canadian train	C. P. R.	from Smith Falls to Montreal West..	124.0 68.8
Fastest French train	Nord	from Paris to Jeumont	147.7 66.1
Fastest German train		from Spandau to Bergedorf	161.1 63.0
Fastest Roumanian train		from Bucharest to Braila	142.0 47.3
Fastest Italian train		from Milan to Bologna	134.5 53.7
Fastest Dutch train		from Amsterdam to Rotterdam	54.0 48.0
Fastest Belgian train		from Antwerp to Brussels	27.5 51.5

THE TREND OF AFFAIRS

Preventing Earthquake Damage

AT LEAST one benefit may result from the recent earthquake in Southern California. For the first time there were located at the center of destruction seismographs capable of obtaining data useful to the engineer in designing earthquake-resisting buildings. "It is amazing," wrote the late John R. Freeman, '76, in *The Review* of December, 1931, "that the American structural engineer possesses no reliable data to aid him in the design and construction of buildings to withstand earthquakes. Although there are approximately 50 seismography stations in this country and a still larger number of seismologists, both professional and amateur, their studies of earthquakes have contributed little to the sum of engineering knowledge on the form, amplitude, or acceleration of the motion of the earth during a great earthquake. . . .

"Few textbooks in the English language make any reference to the design of structures to resist earthquake forces. Accurate data about the form, amount, and acceleration of earthquake motion in the area of greatest vibration during an earthquake, and comprehensive experiments by means of shaking-tables on models which follow rigorously the laws of dynamic similitude, will be a tremendous aid in the economical design of earthquake-resisting structures, and will form a strong incentive for authors to include this subject in future textbooks on structural design."

Through the efforts of Dr. Freeman, the U. S. Coast and Geodetic Survey, and other engineers, strong-motion instruments have been designed in recent years capable of recording earthquake waves at the place where they are most destructive. The accelerometer developed by M. W. Braunlich in the Institute's Department of Civil Engineering and used by the Coast and Geodetic Survey is an example.

A number of these earthquake "traps" had been only recently located in the region around Los Angeles and, while reports are not yet available, it is likely that they recorded information which may help to take the guesswork out of the construction of buildings in earthquake zones.

The theory of measuring the earthquake force which a building is called upon to resist is simple: Any force can be measured by the acceleration, or rate of increase in velocity, measured in feet per second per second, which this force is capable of producing on a body free to move. The force of gravity is measured by the acceleration due to gravity; that is, by the acceleration which this force of gravity produces on a freely falling body. Gravity serves as a convenient and universal standard of force with which the force exerted upon a structure by earthquakes may be compared. The problem before the engineer is, therefore, to design for an earthquake acceleration having some definite percentage of the acceleration produced by gravity.

If the new instruments located in the California earthquake area obtained information about the acceleration of the earth which occurred during the quakes, engineers will have available the first reliable data for designing buildings to resist quake stresses.

In an addendum to his monumental book, "Earthquake Damage and Earthquake Insurance" (McGraw-Hill Book Company), written in January, 1932, Dr. Freeman set down the following rules for taking care of the stresses produced by earthquakes:

"1. Design future important buildings up to 100 feet in height to resist a horizontal static force equal to 10% of the total weight (live and dead) above each floor level.

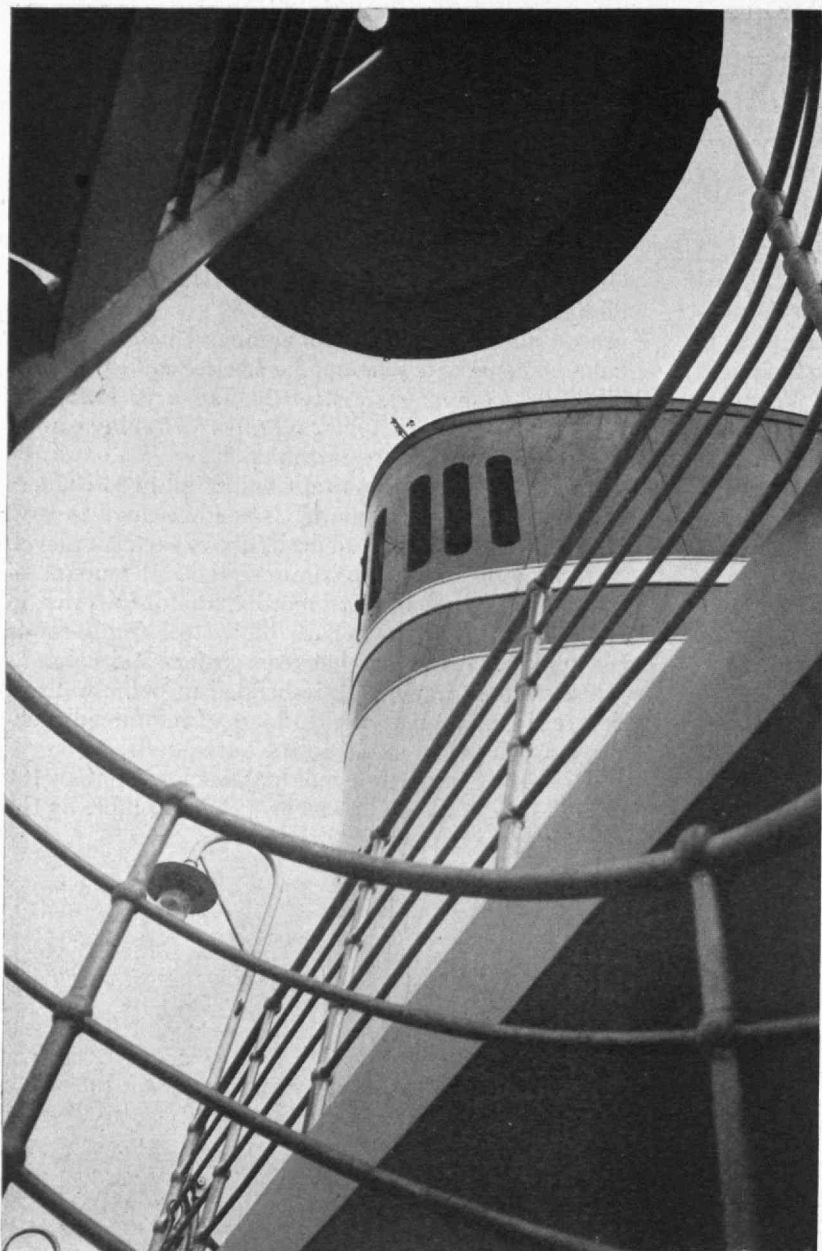
"2. Provide for the maximum practical amount of rigidity, and, in buildings more than four stories in height, obtain this by means of a steel frame made rigid by corner bracings between girders and columns with the whole framework imbedded in outer walls of reinforced concrete, and with floors of reinforced rock-concrete rigidly connected to the outer walls.

"3. For any important building much more than 100 feet tall, try out a scale model on a shaking-table by the principles of dynamic similitude. . . .



M. I. T. Photo

M. W. Braunlich and the starting accelerometer developed by him in the Institute's Department of Civil Engineering. The accelerometer is now being used by the Coast and Geodetic Survey in a strong-motion seismometer capable of recording earthquake motion in the region where destruction occurs



On board the S. S. Conte di Savoia

F. S. Lincoln

"4. That well-built factory buildings and warehouses up to four or five stories high with brick bearing walls, and having strong wooden floors carefully tied into these bearing walls, will resist the worst quaking experienced in Charleston, San Francisco, and Santa Barbara, is tolerably well proved by the evidence of the old Cotton Mill at Charleston, S. C., the Folger Warehouse in San Francisco, and many others.

"5. Wooden dwellings up to two-and-a-half stories tall, designed on common-sense lines, with a well-braced frame and well built, resting on a strong, continuous, concrete foundation, and having plastering on heavy expanded metal lathing, will mostly resist earthquakes wonderfully well and present no hazard to human life. Such buildings can have their chimneys prevented from falling, although built of brick, by reinforcing these with steel angles and bands."

The late Dr. Kyoji Suyehiro, in a series of lectures delivered at the Institute in 1931, pointed out that the acceleration in an earthquake could very rarely be measured accurately from a seismogram, and that the only practicable and proper method for measuring earthquake force by its acceleration was by means of an accelerograph. It is hoped that the California earthquakes will give an impetus to engineering seismology and that readings were obtained which will meet the engineer's requirements and which will afford a basis for building regulations safeguarding life and property against earthquakes.

Shiver Chasers

EVEN as the seismologists make observations of the earth's tremors, so do "vibration engineers" — as they prefer to be called — preoccupy themselves with gathering data on man-made shakings in structures and machines. With the size and complexity of structures and machines ever mounting to higher levels, the problems of man-made vibrations progressively assume a higher position among the factors for which designing engineers must make provision.

Vibratory stresses have always worried machine designers, especially if they existed in such magnitude as to get the owner of a machine into legal difficulties with his neighbors. In less acute situations the presence of vibrations has been a source of annoyance, for they manifested themselves in the failure of parts, in the spoilage of materials being manufactured by the machine, in a lowered quality of its output, and in the decreased efficiency of its operatives.

As in earthquakes, too little has been done to measure accurately the vibrations in structures and machines and to proceed to overcome their baneful effects on a scientific basis. Rule-of-thumb methods have prevailed except for a few such notable cases as the thorough-going investigation of the vibration troubles encountered in turbines. It is the practice of the structural engineer, faced with the design of a railway bridge, for example, to lump all the effects he thinks may be set up by unbalanced drivers and other poundings of a heavy train on the rails under the heading of "impact loads." These he arbitrarily figures will be a certain maximum under any conceivable set of circumstances; and thus he makes allowances in his design in accord with a fancied condition. The machine designer customarily "strengthens parts" also. While such policies may be called allowing a "factor of safety," there is some justification for the claim of vibration engineers that it is really allowing a "factor of ignorance."

The means for getting at the seat of vibration troubles exist and are constantly being improved. Vibrations produced by the moving parts of a machine can be studied by various optical and mechanical devices and, in the case of high-frequency vibrations, which are audible, by a noise analysis. Apparatus is also available to check the relative motion of supposedly fixed parts of a machine to deal with the special problems of machines which control special kinds of vibrations which cannot be eliminated.

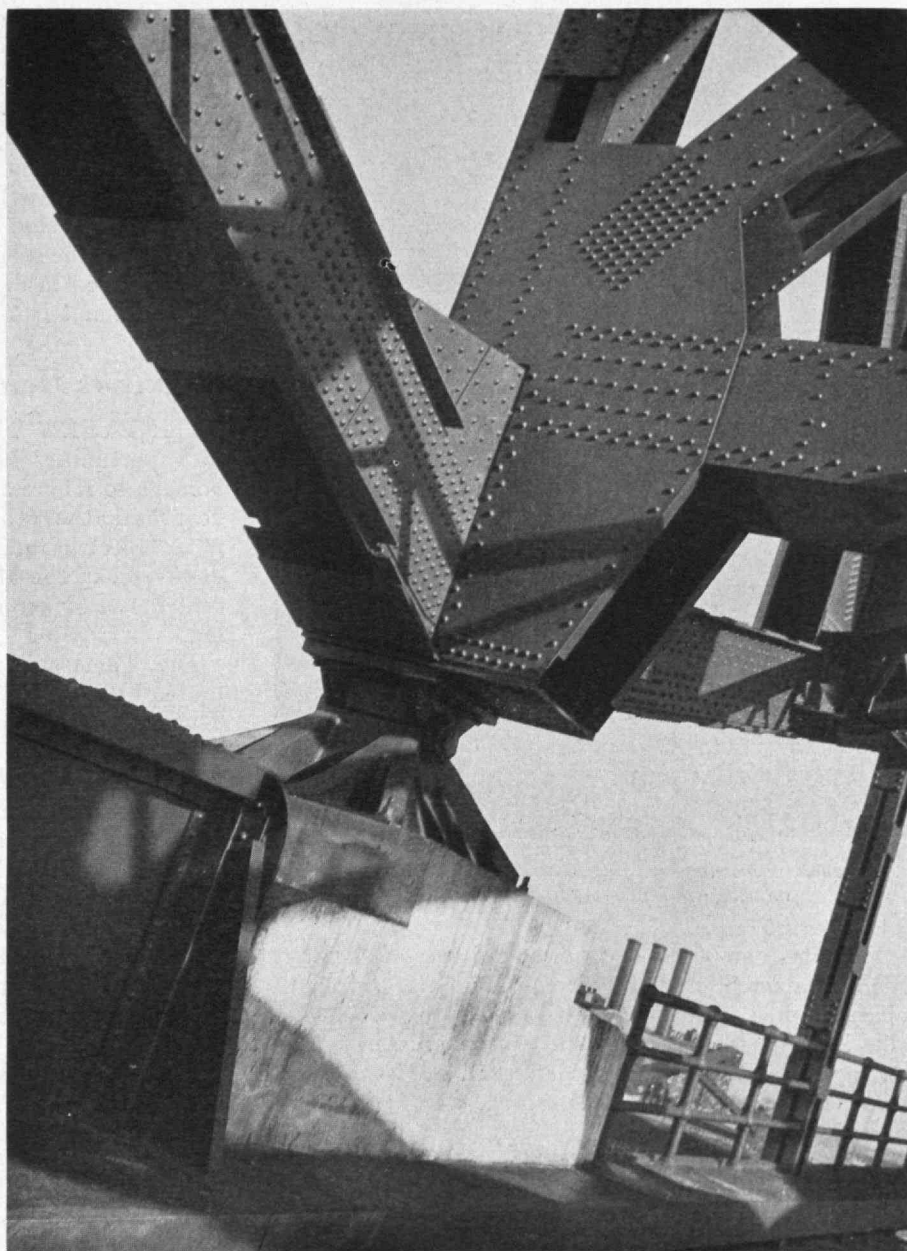
In devising the technique of his attack, the vibration engineer has borrowed from the experience of the seismologist. One of the newest of his instruments is a "photo-seismograph," a compact, portable device by means of which vibrations are considerably magnified and recorded upon cinema film. This has already proven its worth in a variety of ways. Selective isolation of certain vibrations has been known to point the way to such a simple solution as the mere rearrangement of equipment, as was done with a large lithographic camera which had produced blurred images due to an uneven vibration of lens and plate when faced in one direction.

Clock and typewriter makers, automobile and other engine builders, paper manufacturers (where the shake imparted to the moving Foudrinier wires affects the product), naval constructors, and, of course, structural engineers are but a few of those to whom methods for coping with the vibration problem should be very welcome indeed.

But vibration engineering would seem to offer more far-reaching possibilities than correction of readily apparent vibratory troubles in structures and machines. What are the effects of various frequencies and amplitudes of vibrations upon human beings? What influence do vibrations have upon the crystallizations of metals and upon the reduction of ultimate strength in metals? These are but two sectors of the offensive which are open to the vibration engineers as they wage their campaign to push back the rule-of-thumb frontier.

Zinc Becomes an Engineering Material

IMPROVEMENTS in the manufacture of zinc alloys and the peculiar adaptability of the metal for die castings has resulted in a tremendous increase in the

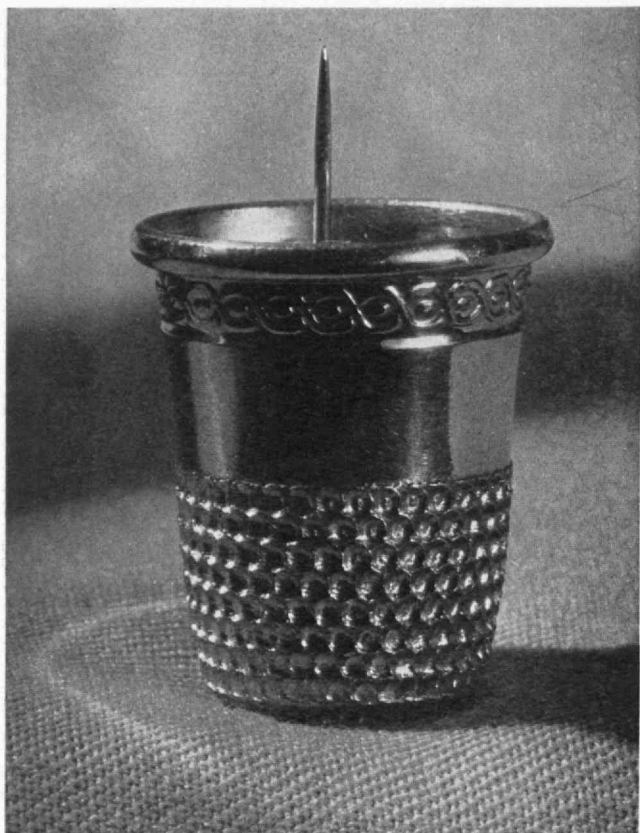


F. S. Lincoln

Fixed-end riveted truss on the New Jersey Highway Bridge which routes the Lincoln Highway above the Jersey meadows

use of zinc within the past few years. It is now being employed for tools, instruments, and innumerable mechanical devices for which the metal was quite unsuited in its old form. In the automobile industry alone the use of zinc has brought marked economies in the manufacture of carburetor parts, ornamental hardware, supports, and light fixtures.

With the new zinc alloys it is possible to produce die castings with surfaces so smooth and accurate that no fitting or machining is necessary. These alloys have characteristics of strength that permit their use for devices working under high pressure and in mechanical operations requiring great resistance to shock. Die cast grease guns of zinc are now being produced for pressures up to 1,200 pounds to the square inch. In gear train assemblies and for industrial hoists, zinc has found a new field of usefulness.



Keystone

"In small proportions we just beauties see." A commonplace thimble with a pin standing upright inside

Porosity, one of the early disadvantages of zinc, has been conquered, and an increase in tensile strength places it in a strong competitive position with malleable iron, brass, gray iron, and aluminum. The tensile strength of certain zinc alloy castings ranges from 35,000 to 50,000 pounds to the square inch, a favorable comparison with malleable iron, which has a strength of from 50,000 to 56,000 pounds. The tensile strength of these zinc castings is greater than that of either sand-cast brass, gray iron, or die-cast aluminum. The impact strength of zinc castings ranges from four to 20 foot-pounds, while that of malleable iron is from eight to 12 foot-pounds.

Zinc alloys, some of which contain copper, aluminum, and magnesium, are particularly well adapted for die castings because of the low melting temperatures. The alloys of lead and tin melt at temperatures between 400° and 500° F., according to the particular alloy. Dies for casting at these low temperatures have exceptionally long lives, a factor of great importance under present conditions of production. Other zinc alloys, particularly those with aluminum bases, melt at temperatures up to 850°. The life of dies depends upon the natures of the alloy and the pressures required in the casting process. The range for the alloys in which aluminum is a part is from 50,000 to 200,000 castings, while for the zinc-lead-tin alloys the count may mount to as much as 500,000 castings.

The fact that zinc castings may be finished in various ways, including gold, silver, nickel, brass, and chromium plating, clearly indicates the possibilities for

many uses in which beauty is a deciding factor. The metal also may be lacquered, enameled, and electroplated. The smooth finish of zinc die castings is an important consideration when such finishes are applied.

What has already been accomplished with zinc, the use of which a few years ago was limited to a narrow field, indicates that it will continue to grow in importance as its value for new industrial purposes is discovered. In the space of six years the percentage of zinc tonnage used in die castings has increased from 2.1% to approximately 7%.

Engineers Hail Their Great

NINETEEN THIRTY-THREE offers many opportunities for the engineering profession to do homage to its great figures, both living and dead. The year marks the 80th birthdays of Elihu Thomson (March 29), "Electrician," and John F. Stevens (April 25), discoverer of the Marias Pass. It likewise yields many centenaries of men renowned in the history of engineering.

Dr. Thomson's birthday was appropriately celebrated by a dinner held at the Institute, of which Dr. Thomson was Acting President from 1920 to 1922 and of which he is now a Life Member of the Corporation. International in its significance, the birthday dinner drew an imposing group of leaders in science, engineering and industry to honor the "American Faraday," the man who holds the third largest number of patents ever obtained in the United States, one of America's greatest figures in science and engineering.

The dinner for Dr. Thomson was preceded by an afternoon meeting at which papers were presented discussing the historical development of the applications of electricity, recent experimental trends, and modern electrical theories. At this meeting an impressive exhibit of many of Dr. Thomson's inventions was on view. Readers of The Review will recall President Karl T. Compton's sketch of his life in The Review, Vol. 33, No. 4.

John F. Stevens has been a major figure in American civil engineering. He was appointed chief engineer of the Panama Canal and chairman of the Isthmian Canal Commission in June, 1905. In this capacity, Mr. Stevens opposed a sea-level canal and influenced the adoption of the lock type, which has proved so successful. His greatest contribution to the work was procuring the plant and creating the organization for the dry excavation and solving the transportation problems involved in the removal of the earth. He resigned in April, 1907, and was elected Vice-President of the New York, New Haven and Hartford Railroad in charge of operation, a position he held two years, then becoming President of the Spokane, Portland and Seattle Railway and the Oregon Trunk Railway, during the period the latter road was being built.

A month after the entry of the United States into the World War, Mr. Stevens was sent to Siberia, in response to a request made by the Kerensky government, as chairman of a commission of railway engineers. This commission made recommendations to increase the effectiveness of the 5,500 miles of road stretching from Kola Bay to Vladivostok and Mr. Stevens was Presi-

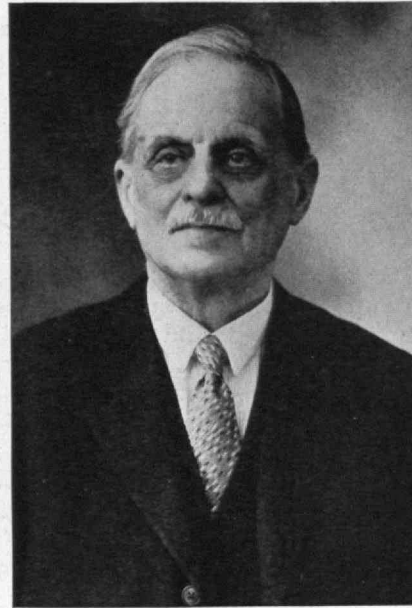
dent of the Inter-Allied Technical Board supervising the Siberian Railways until his return to the United States in 1923. Subsequently he has engaged in consulting practice. One of his best-known accomplishments was the discovery of Marias Pass, the lowest railroad route through the Rocky Mountains, where the Great Northern Railway crosses the Continental Divide at an altitude of less than a mile above sea level.

Among the centenaries of engineers which occur this year the most important is that of Richard Trevithick, the great Cornishman, whose death took place at Dartford, April 22, 1833. His two passions in life were wrestling and machinery, and that he was at least good at the latter was attested by his many contributions to mechanical engineering. His boldest act was to employ high pressure steam for the operation of non-condensing engines, a stroke which led to the steam locomotive. In 1791 an engine of Trevithick's construction hauled the first load of passengers ever drawn by steam power, and in 1804 at Pen-y-daren, Wales, he introduced the first locomotive to be put to a practical use. It hauled behind it five "waggon" loaded with 70 passengers and ten tons of bar iron.

His accomplishments extended into many fields: He is credited with having been the first to recognize the advantages of iron as a ship-building material; he built the first high pressure steam threshing machine, and predicted that machinery would "double the population of the Kingdom and make our markets the cheapest in the world"; and he invented the plunger pole pump for deep mining. It is fitting that English engineers are planning to accord him posthumous acclaim and to erect memorials.

A few months before Trevithick died, the German inventor, Friederich König, the pioneer of the modern steam-driven printing machine, passed away at Oberzell. König introduced the flat-bed printing machine, in which the paper was pressed against the type by a revolving cylinder, and it was with one of his machines that the London Times of November 28, 1814, was printed.

Among the many men born in 1833, a century ago, who contributed to engineering progress were Henry Wilde (1833-1919), one of the leading inventors of the dynamo; James Robson (1833-1913), whose work on the gas engine gives him a place among pioneers; Sir Richard Tangye (1833-1906), a founder of the great Cornwall Works, Birmingham, England, and a generous benefactor of that city; and Alfred Bernhard Nobel



Elihu Thomson, whose 80th birthday was celebrated at Technology on March 29. See opposite page

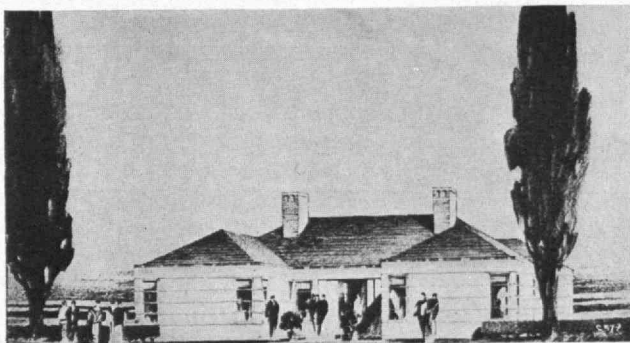
(1833-1896), the Swedish engineer and chemist, the inventor of dynamite, and the founder of many works, who by his will left the endowment of the famous Nobel prizes. With his brothers, Ludwig Nobel (1831-1888) and Hjalmar Nobel (1829-1896), he was concerned in the development of the Baku oil fields.

Cast-Iron Paving

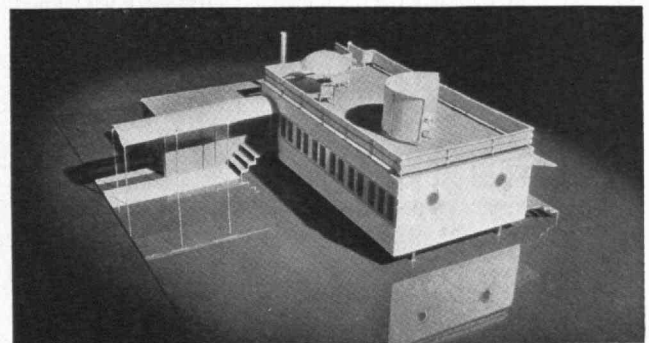
HOW to pave a road surface subject to severe attrition has always been a difficult problem, even with the many road materials lately become available. An English company, so reports *Engineering* (London), has introduced a new surfacing material which is claimed to be not only cheaper but more durable than granite, and to involve no maintenance costs.

This new highway surface, which is known as the Stanton Iron Road, is built up of blocks of cast iron, one foot square and two inches deep, imbedded in bitumen. Diamond-shaped studs prevent skidding.

The blocks are recommended for bus stopping places, factory loading floors, ways at docks, wharf surfaces, and railway platforms.



Left: A house of wood designed by Ernest Grunsfeld, Jr., '18, which will be exhibited at Chicago's 1933 World's Fair to demonstrate the use of lumber as a building material. Right: Model of a cotton-covered house designed by A. Lawrence Kocher, '13



F. S. Lincoln

THE INSTITUTE GAZETTE

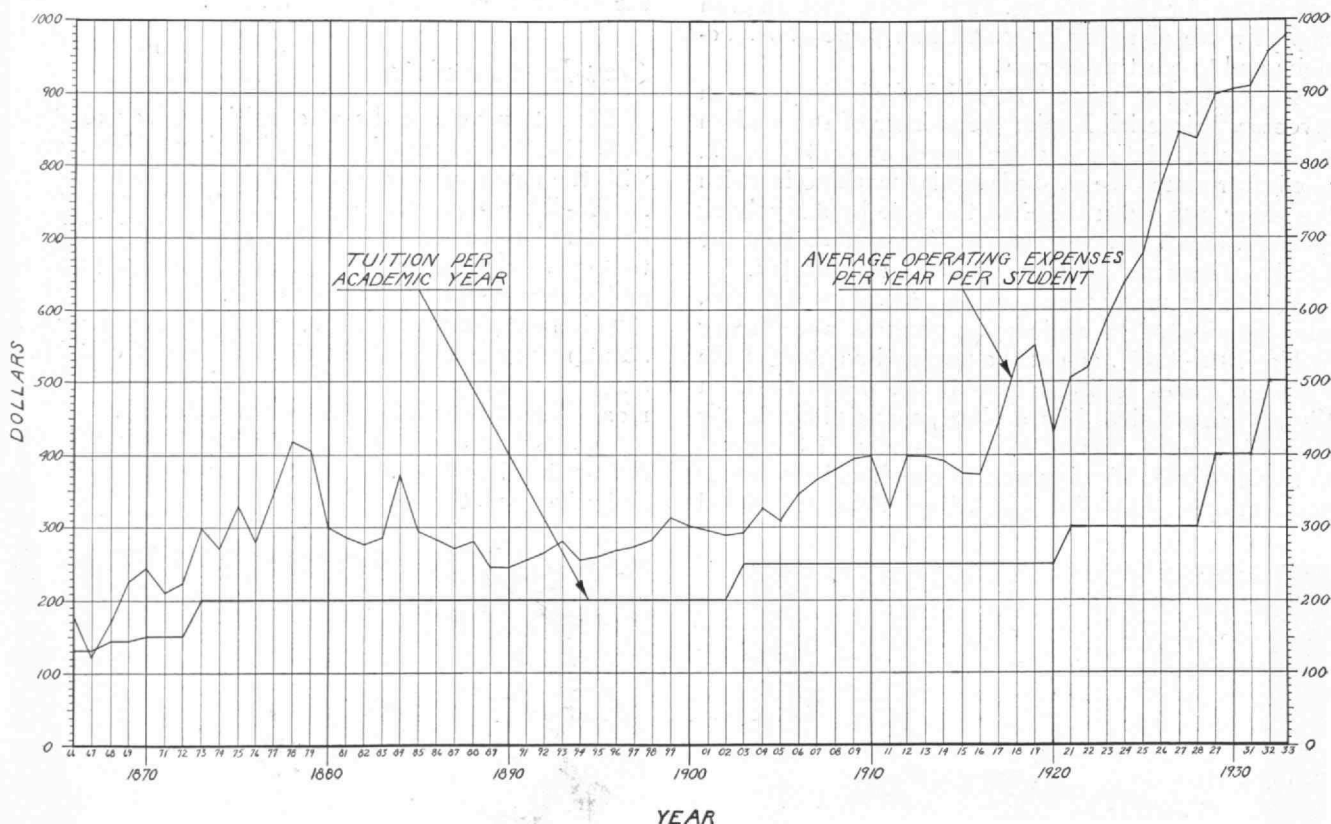
Alumni Nominations

ONE of the most important functions of the Alumni Council is the nomination of officers of the Alumni Association and of candidates from which Term Members of the Corporation may be selected. By statutory provision, the Council entrusts this duty to one of its standing committees, the Committee on Nominations. This group of nine men annually submits to the Alumni body one candidate for each Alumni Association office and, in accordance with the practice adopted last year, one candidate for each of the three vacancies which annually occur in the Corporation.

After considering several hundred names, the Committee unanimously selected as the three nominees for the Corporation: Allan W. Rowe, '01, Director of Research of the Evans Memorial, Massachusetts Memorial Hospitals, Boston, and for the current year President of the Alumni Association; Louis S. Cates, '02, President of the Phelps Dodge Corporation, New York; and Harold B. Richmond, '14, Treasurer of the General Radio Company, Cambridge.

On the ballot which has been mailed to Alumni, these three names are presented for the ratification of the Alumni electorate and then in turn they will be presented to the Corporation for formal election, that body invariably accepting the nominations of the Alumni Association. They are nominated to replace: William S. Forbes, '93; Lamont du Pont, '01; and Frank B. Jewett, '03; whose five-year terms expire in June.

On the same ballot has been included the other nominations made by the Committee and approved by the Alumni Council. Chief among these is Redfield Proctor, '02, to succeed Dr. Rowe as President of the Alumni Association. President-elect Proctor has had a distinguished career in business and government. He was Governor of Vermont from 1923 to 1925, President of the New England Council from 1928 to 1930, and he is a Life Member of the Institute's Corporation. Beginning practice as a mechanical engineer in 1902, he eventually became President of the Proctor Trust Company and the Vermont Marble Company. He is a trustee of Middlebury College and Vassar and a member of the American Society of Mechanical Engineers. His home is in Proctor, Vt.



EDUCATIONAL COSTS AT M. I. T.

The above chart shows the tuition charged per academic year at the Institute from 1865-1866 through 1932-1933 plotted against the average operating expenses of the Institute per year per student for the same period. It should be noted how much in excess of tuition the Institute's operating expenses have always been with the exception of one early year, and how much more rapidly these expenses have increased in recent years in contrast with the increases in tuition



Notman



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Stein

NOMINATED FOR TERM MEMBERSHIP ON THE CORPORATION

From left to right: Allan W. Rowe, '01; Louis S. Cates, '02; Harold B. Richmond, '14

To be Vice-President of the Association for two years, the Nominating Committee selected Edward L. Moreland, '07, partner of Jackson and Moreland of Boston; and to serve on the Executive Committee for two years, Grosvenor D. Marcy, '05, President of Sampson and Murdock Company of Boston; and Charles E. Smith, '00, Vice-President of the New York and New Haven Railroad. As representatives at large on the Alumni Council, the Committee selected: Richard H. Ranger, '11, John J. Thomas, '07, Harry L. Noyes, '90, Charles R. Boggs, '05, and A. W. K. Billings, Jr., '26.

To all of these nominees The Review extends felicitations and to the Nominating Committee congratulations for the excellence of its judgment in selecting so acceptable a slate for both the Corporation and the Alumni Association.

164th Council Meeting

SEVENTY-TWO members and guests at the Council Meeting in Walker Memorial on February 27 heard the above report of the Nominating Committee and accepted it unanimously. During the dinner preceding the meeting, President Rowe delivered his own salad oration. He described two trips he had made to Technology clubs, one during the week of February 6 to Cleveland, Detroit, Chicago, and Minneapolis; the other during the week of February 20 to Albany, Schenectady, Utica, and Syracuse. Dr. Rowe noted particularly that the Technology men he met seemed to be weathering the depression excellently.

The Committee on Greater Activity of Boston Alumni, composed of H. M. Haley, '04, J. C. Damon, '05, R. B. Wills, '18, C. M. Chase, '32, and L. F. Hamilton, '14, chairman, had held a meeting prior to the meeting of the Council, and the chairman reported informally on the preliminary conclusions arrived at by this Committee. The Committee has ascertained that there are 3,800 graduates of the Institute (not including former students who never graduated) who live in a 20-mile radius of Boston, and pointed out that there was very little opportunity for this large group of Technology alumni to get together. The only possible opportunity was the Annual Alumni Dinner of the Association, which this year brought out only 425.

The Committee felt, subject to further consideration, that it would be wise to attempt to organize this group in two ways: first, by holding low-priced smoker meetings in Walker Memorial, and, second, by appointing leaders in various suburbs to stimulate activities in these particular areas. It would be the duty of these geographically distributed leaders to bring together the alumni in their districts and to attempt to stimulate their interest in the Institute.

The President introduced two visitors: J. D. Melliish, '96, of Colombia, South America, and Thomas D. Green, '26, Secretary-Treasurer of the Technology Club of Hartford. The business meeting was concluded by a brief report from the Acting Secretary and the President then presented two speakers, Professor Ralph D. Bennett of the Department of



Redfield Proctor, '02, sole nominee to the Presidency of the Alumni Association for the year 1933-1934

Electrical Engineering at the Institute, and Edward P. Beckwith, '01, who was associated with Professor Bennett on his cosmic ray expedition to Mount McKinley this past summer. Both of these talks are reported on page I of the supplement to this issue. The Council was obviously impressed and pleased by Professor Bennett's and Mr. Beckwith's presentation.

Athletic Accomplishments

IT IS a pleasure for The Review to record some recent outstanding achievements of Institute athletes and athletic teams, and to confer an accolade in behalf of Technology Alumni upon those responsible. On March 4 Captain Richard Bell, '34, set a new Intercollegiate A.A.A.A. indoor record of seven seconds flat in winning the 70-yard dash at the Annual Indoor Championship Meet, New York. In addition to creating a new collegiate mark, Bell also equalled the world's record established by Loren Murchison in 1923. He is the first Technology man since 1926 to capture an I.C. 4-A. title. Track Coach Oscar Hedlund deserves much credit for his training of Bell.

His performance on March 4 was but another laurel in the career of the Technology captain. Out of 24 heats in indoor racing this season, he won 14, and of seven races he was victorious in four. Technology's I.C. 4-A. champion in 1926 was Henry G. Steinbrenner, '27, who won the 220-yard low hurdles at the outdoor meet in Philadelphia. Another recent track achievement was a new Institute one-mile relay record of 3:30½, set by Rodolfo Rosas, '33, Richard Jarrell, '35, Her-



Lester Jones, Boston Herald

Captain Richard Bell, '34, of the Technology track team who set a new intercollegiate A.A.A.A. indoor record of seven seconds flat in winning the 70-yard dash at the Annual Indoor Championship Meet in New York, March 4

bert Schwarz, '34, Walter Wrigley, '34. Wrigley is one of the two Edison scholars at Technology who have proven themselves excellent athletes. The other is Ivan A. Getting, '33, recently elected a Rhodes scholar.

On Saturday, March 11, Niazi I. Mostafa, '33, won the New England Intercollegiate wrestling title in the 155-pound class. At the same time Donald E. Henshaw and Edward A. Boyan won the Freshman titles in the 175-pound and the 135-pound class.

Finishing the season with a record of ten victories and of two defeats, the Technology basketball team has made its best showing in years, and the finest under the coaching of Henry P. McCarthy.

THE ADVENT OF THE LENS

(Concluded from page 249)

of the future have been more frequently referred to than quoted. It may thus be convenient to give here a translation of his actual words regarding optical possibilities. It will be seen that these passages, though often startlingly suggestive, yet lack all technical definition.

"Glasses (perspicua) can be so constructed that objects at a very great distance appear to be quite close at hand, and conversely. Thus we may read the smallest letters from an incredible distance, number objects, however small, and can make the stars appear as near as we wish. . . . Also objects can be made to appear so that the greatest seems the least, and conversely; what are high appear low, and conversely; and what is hidden, manifest. . . .

"Among the more subtle powers of construction is this of directing and concentrating rays by means of [instruments of] different forms and reflections at any distance we wish, where whatever is subjected to them is burned. . . . But greater than any such design or purpose is that the heavens might be portrayed in all their length and breadth on a corporeal figure moving with their diurnal motion, and this would be worth a whole kingdom to a wise man."

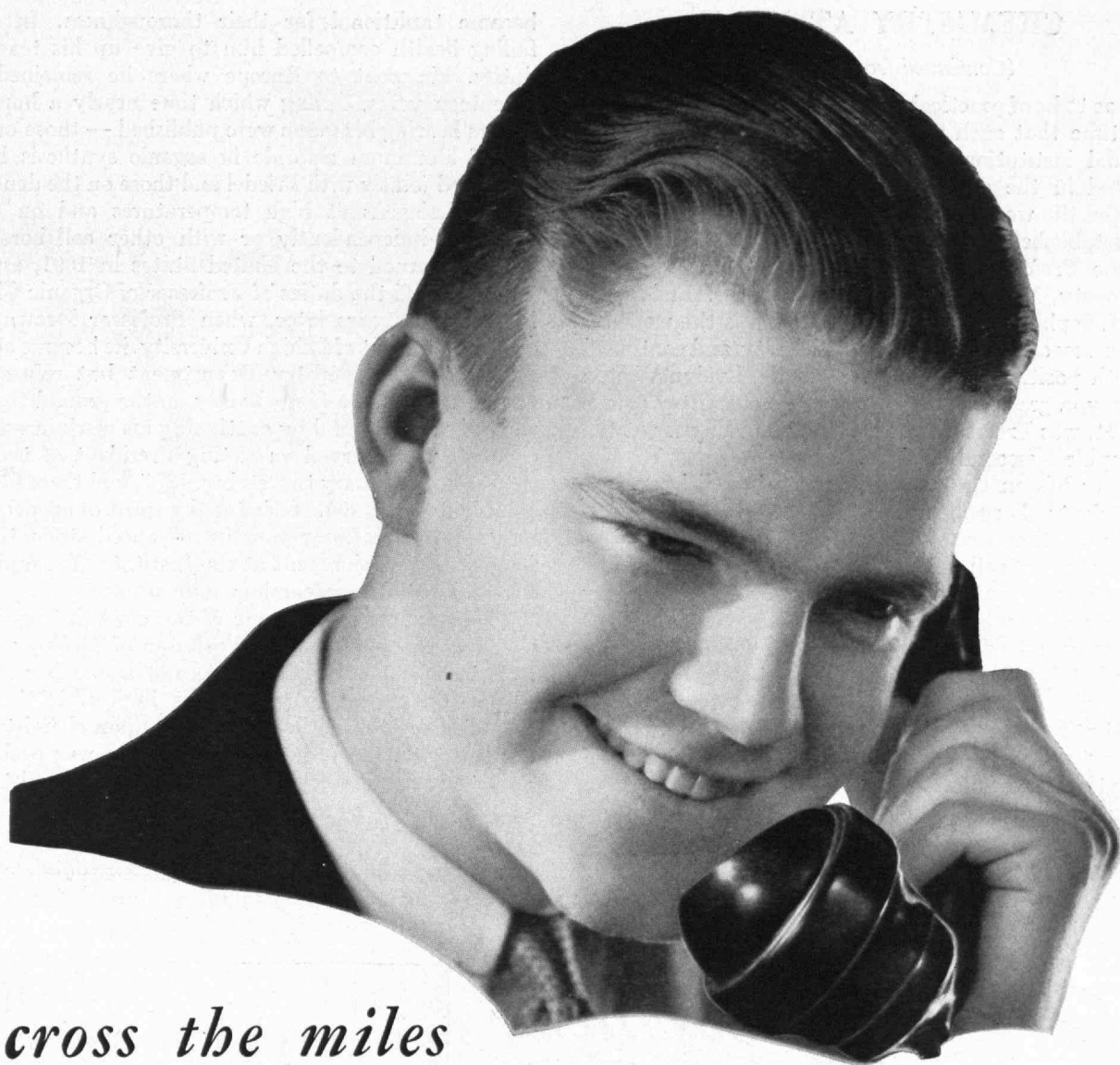
Roger Bacon's suggestion concerning the application of lenses as spectacles was early adopted, though the exact details of the introduction of these useful aids to

vision are still much in dispute. Spectacles were, however, certainly in use before the Fourteenth Century. They are mentioned by the French physician Bernard de Gordon (died 1307) in his famous work the *Lilium Medicinæ* written about 1300. Bernard calls them *berylli*. These early spectacles were, in fact, cut from beryl. The name is still preserved in the modern German word for spectacles *Brille*. It is a little concealed in the French *bésicle* which passed into the modern language through the medieval *béricle* and *berille*.

By the Fifteenth Century convex lenses were well known and frequently in use as spectacles. We give several examples in our illustrations (Figs. 7, 8 and 9).

At the beginning of the Sixteenth Century that universal genius Leonardo da Vinci was at work on optics. He had a clear idea of the nature and action of a camera obscura for which he used a pinhole (Fig. 11). He compared the action of the pinhole, not inaptly, to that of a lens and suggested that the eye was of the nature of a camera obscura. He clung to Alhazen's medieval idea of the lens of the eye as spherical and placed in the center of the globe of the eye where he considered the incoming rays of light all crossed (Fig. 10). He attained however to a more correct notion than had yet been reached of the action of lenses in spectacles (Fig. 12).

The century which followed Leonardo saw those optical advances which made possible the construction of the first telescopes and microscopes.



Across the miles
comes a **WELCOME VOICE**

IT MAY be the voice of a son or daughter away at school. Of a mother or father in a distant city. Of a friend or neighbor who is wondering how you are. Of a business associate upon whose quickly spoken words some great decision rests.

Across the miles, the telephone brings those voices to you and carries your voice in answer. A bell rings and you reach out your hand, knowing that somewhere—near or far—another hand is reaching toward you.

The telephone enlarges the lives and opportunities of all who use it because it enlarges the power to communicate through speech. Contacts with people, ideas exchanged, words spoken—by these are our minds

stimulated and the entire business of living made more pleasant and productive.

Because the telephone is so important to so many people, the Bell System strives to make its full usefulness available to every one, everywhere, at all times. Always it tries to emphasize the close contact between each telephone user and the unseen men and women who make good service possible. Always it aims to serve with courtesy, dispatch and sympathetic understanding.

Your telephone offers you the service of a friend. At any hour of the day or night, you have but to turn to it to command as many as you need of the Bell System's army of carefully trained workers.



AMERICAN TELEPHONE AND TELEGRAPH COMPANY

CHEMISTRY AT M. I. T.

(Continued from page 252)

scale as to be of practical value. This, we believe, was the first time that such work was introduced into an educational institution. Professor Ordway was much interested in the education of women in science, and directed the work of the Women's Laboratory after it was established in 1876. In 1884 he left the Institute to become Professor of Industrial Chemistry at Tulane University, New Orleans, and Professor of Biology at the H. Sophie Newcomb College, which is the women's college associated with Tulane University, and continued in both positions until 1897. His wife, Evelyn Walton Ordway, a graduate of the Institute's chemistry course in 1881, was Professor of Chemistry and Physics at the H. Sophie Newcomb College.

James Mason Crafts, whose name is well known to all students of organic chemistry because of the Friedel-Crafts reaction, came to the Institute from the newly-organized Cornell University where he had been Professor of Chemistry and Chairman of the Chemistry Department from 1867 to 1870. He succeeded Storer as Professor of General and Analytical Chemistry, and immediately devoted his energies, not only to routine teaching, but to the improvement of laboratory facilities and the encouragement of research. When Warren left the Institute in 1871, Crafts was made Professor of Analytical and Organic Chemistry. He used German textbooks in the latter subject and gave courses which

became traditional for their thoroughness. In 1874 failing health compelled him to give up his teaching duties. He went to Europe where he remained for seventeen years, during which time nearly a hundred papers bearing his name were published — those on the use of aluminum chloride in organic synthesis being published jointly with Friedel and those on the densities of the halogens at high temperatures and on thermometry independently or with other collaborators. Crafts returned to the United States in 1891, and in 1892 resumed the duties of Professor of Organic Chemistry. Three years later, when Professor Drown was elected President of Lehigh University, he became acting Head of the Chemistry Department but refused to accept the position permanently on the ground that he would be more useful by continuing his work in organic chemistry. He served as Acting President of the Institute from January to October, 1897, and thereafter as President until 1900. He fostered a spirit of coöperation between the professor and the advanced student, and foresaw the development at the Institute of a graduate school devoted to research in pure science.

Thomas Sterry Hunt, one of the most distinguished chemists of his time, was Professor of Geology from 1871 to 1878. Although he was not a member of the Chemistry Department, it seems impossible that he should have been without influence upon chemistry at the Institute. Let it be recalled that he was probably the first to define organic chemistry as the chemistry of carbon and its compounds. (Continued on page 266)

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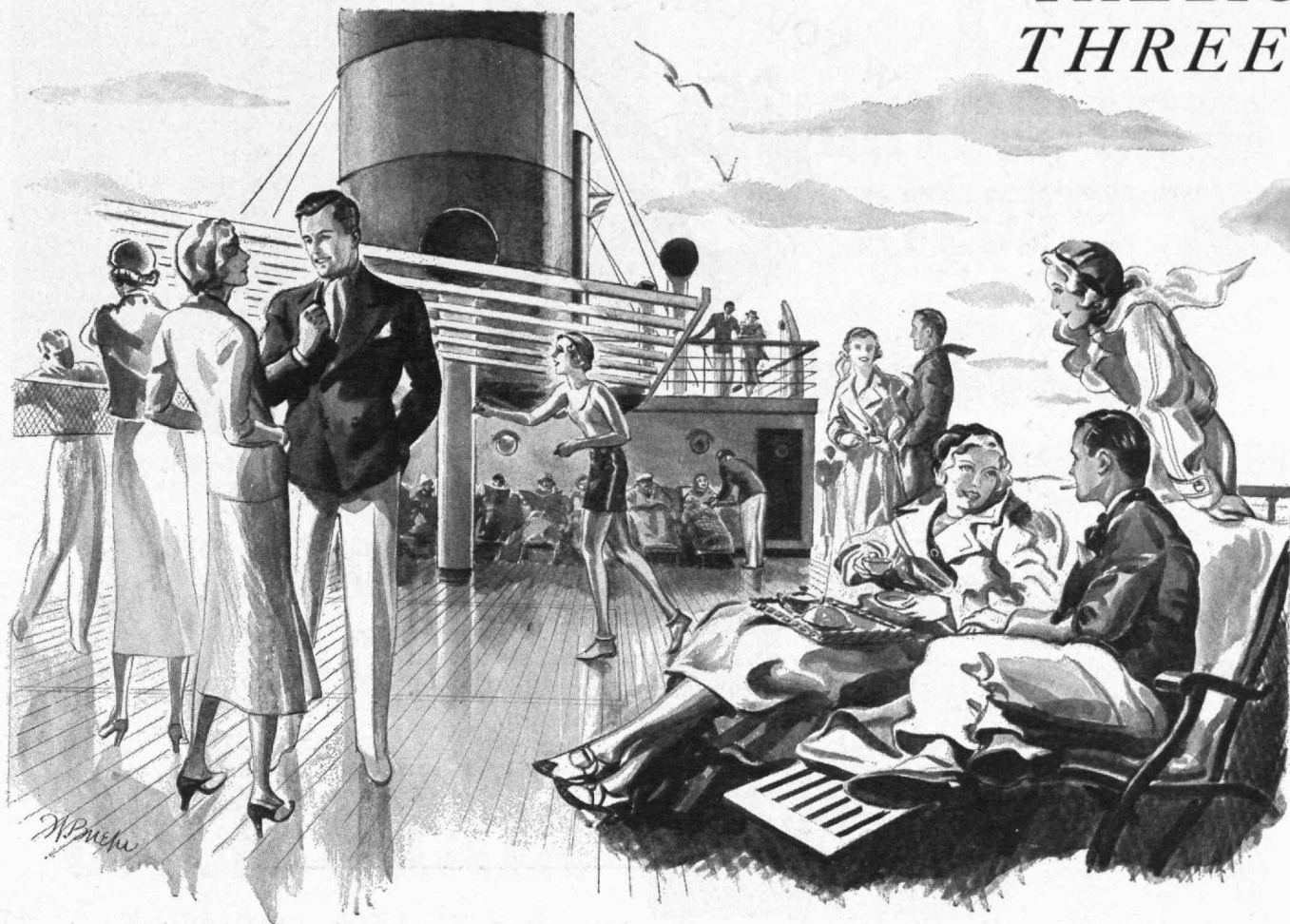
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CHEMISTRY AT M. I. T.

(Continued from page 264)

He stood on the advancing frontier of chemistry. He originated the theory of simple water types, and the germs of the ideas usually attributed to Gerhardt may be found in his earlier papers. His researches upon the equivalent volumes of liquids and solids were a remarkable anticipation of Dumas. He had definite and significant ideas on the real molecular complexity of mineral substances. Among his more practical achievements may be mentioned his invention and patenting, in 1859, of the permanent green ink which has found wide use in the printing of greenback currency. He was a charter member of the American Chemical Society and President of that organization in 1879 and 1888.

Professor Lewis Mills Norton in 1888 founded the Course in Chemical Engineering, the first such course, we believe, to be anywhere established. In 1891 seven Bachelor's degrees were awarded in Chemical Engineering, eleven in Chemistry. The Institute's Course in Chemical Engineering has long been a matter of interest to industrial chemists and to teachers in this country and abroad. The great German industrial chemist, Georg Lunge, early visited the Institute for the purpose of inquiring into the organization of the course in Chemical Engineering and of examining its equipment.

More recently professors from Russia and Japan have asked many questions. For 12 years after 1891, the number of degrees in Chemistry was greater than the number of those in Chemical Engineering, on the average about twice as great, until 1907 when 14 degrees were given in Chemical Engineering and ten in Chemistry. In 1908 there were 15 in Chemical Engineering and sixteen in Chemistry. From 1909 onward there have been more Bachelor's degrees each year in Chemical Engineering than in Chemistry. Much of the early success of the course in Chemical Engineering was due to the enthusiasm and skilful teaching of Professor Frank Hall Thorp, '89, whose "Outlines of Industrial Chemistry" was first published in 1898.

In 1908 the Research Laboratory of Applied Chemistry was organized under the directorship of Professor William Hultz Walker, who in 1912 was also given charge of the course in Chemical Engineering. He retained both positions until 1920, in which year the single Department of Chemistry and Chemical Engineering was divided into two separate Departments. The Department of Chemistry remained for two years longer under the leadership of Professor Henry Paul Talbot who had been in charge of the joint Department since 1907. Professor Frederick George Keyes is at present Head of the Chemistry Department and Director of the Research Laboratory of Physical Chemistry.

(Continued on page 268)



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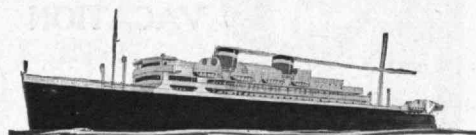
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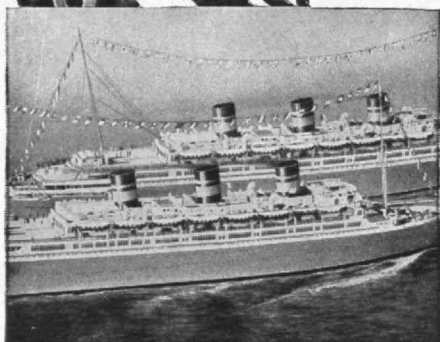
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CHEMISTRY AT M. I. T.

(Continued from page 266)

Henry Paul Talbot graduated from the Institute in 1885, and remained here as Assistant and as Instructor in Chemical Analysis until 1888. He then went to Leipzig where he carried out the Doctor's *Arbeit* under the direction of Johannes Wislicenus and listened to the lectures of Wilhelm Ostwald from which he gained an insight into the new physical chemistry which was soon to develop into a special branch of the science. He returned to the Institute in 1890, was promoted through the various grades, and became Professor of Analytical Chemistry in 1898. When Professor Drown left the Institute in 1895, Talbot became nominal Head of the Department. In 1901 he was officially appointed to that position. From 1920 to 1923 he served as Chairman of the Administrative Committee which conducted the affairs of the Institute during the interregnum which followed the death of President MacLaurin. He was Acting Dean during the academic year, 1921–1922, after which he left the Chemistry Department and devoted himself to the duties of the Dean of Students until his death in 1927.

After his return from Germany Talbot started and maintained with success a course in physical chemistry which was one of the first courses of the kind to be given in this country. Notions based upon the ionization theory were introduced into the courses in analytical chemistry through his textbook on "Quantitative Analysis." "The Electrolytic Dissociation Theory" by Henry Paul Talbot and Arthur A. Blanchard, '98, which first appeared in 1905, helped greatly at a time when discussions of the subject had not yet been written into the elementary textbooks.

Arthur Amos Noyes, the "Dean of American Physical Chemists," became a member of the staff of the Chemistry Department in the year in which the *Zeitschrift für physikalische Chemie* commenced publication. Noyes graduated from the Institute in 1886 and remained for a year's study for the Master's degree and for another year as Assistant in General Chemistry. He spent two years in Leipzig, a fellow-student of Talbot, and was awarded the Ph.D. degree at the same time, in 1890. He then returned to the Institute to engage in the teaching of analytical chemistry until 1892, of organic chemistry until 1899, and of theoretical chemistry until 1920 when he left to become Director of the Gates Chemistry Laboratory of the California Institute of Technology. He served as Acting President of the Massachusetts Institute of Technology, 1907–1909. His "Detailed Course in Qualitative Chemical Analysis with Explanatory Notes" first appeared in 1894, but he continued to work on the same subject and later developed a qualitative procedure capable of detecting the rare as well as the common elements, any or all of them, in quantities as small as a single milligram. The "Laboratory Experiments on the Class Reactions and Identification of Organic Substances" by Noyes and Samuel P. Mulliken, '87, first published in 1897, describes simple test-tube experiments selected to illustrate the principal types of organic reactions. Students who are preparing themselves for the Doctor's (Continued on page 270)

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CHEMISTRY AT M. I. T.

(Continued from page 268)

examination in organic chemistry still find profit in studying it. It constitutes a sort of prolegomena to Mulliken's large treatise, "A Method for the Identification of Pure Organic Compounds by a Systematic Procedure Based on Physical Properties and Chemical Reactions," in three volumes, the first volume of which was published in 1904.

Willis R. Whitney, '90, for many years Director of the Research Laboratory of the General Electric Company, was Instructor in Theoretical Chemistry and Proximate Technical Analysis from 1898 to 1900, Assistant Professor of the same subjects from 1900 to 1903, and Assistant Professor of Theoretical Chemistry in 1903-1904. Noyes became Professor of Theoretical Chemistry in 1899, and Arthur A. Blanchard and Miles S. Sherrill, '99, were the first members of the Chemistry Department to be listed as Assistants in Theoretical Chemistry. The text, "Chemical Principles," by Noyes and Sherrill, was developed gradually; mimeographed sheets were used in class, then printed pamphlets for a number of years; revisions and additions were made, and the whole was finally published as a book in the regular manner. Brief and very clear discussions of each point are followed by problems in which the student is obliged to think his way to the center of the difficulty. "Chemical Principles" inaugurated a new method for the teaching of physical chemistry.

In 1903 the Research Laboratory of Physical Chemistry was organized with Noyes as Director, and in 1907 the degree of Doctor of Philosophy was awarded to three of its students, to Raymond Haskell, '03, Robert B. Sosman, '04, and Morris A. Stewart, '07. This was the first time that the Doctor's degree was awarded by the Institute. A list of those who have since graduated from the Research Laboratory of Physical Chemistry contains the names of many of the most distinguished physical chemists of this country. Two hundred and ninety one scientific papers from the Laboratory have been published to the end of 1932.

Under the leadership of Noyes a project was started at the Institute which soon developed into *Chemical Abstracts* and thus contributed to the needs of research workers throughout the world. *The Technology Quarterly and Proceedings of the Society of Arts* of 1895 contains the first issue of a systematic "Review of American Chemical Research," the aim of which was "to present in a concise form a review as complete as possible of all original work having a chemical bearing published in the United States after the beginning of the year 1895." It was believed that "such a compilation will prove of more than unusual value in the case of the research work of this country by reason of the fact that so large a proportion of it is published in other than chemical journals, and thus fails to become incorporated with the rest of the science, and also because the abstracts of American chemical literature published in foreign journals are very incomplete." The "Review" appeared under the general editorship of Noyes, with the assistance at first of Clement W. Andrews, William O. Crosby, '76, Augustus H. Gill, '84, Harry M. Goodwin, '90, Heinrich O. Hoffman, Ellen H. S. Richards, '73, John W. Smith, Henry P. Talbot, '85, and Frank H. Thorp, '89, as abstracters. Other members of the Chem-



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istry Department later joined the group of abstracters. The next year a circular was sent out which announced that the "Review of American Chemical Research" for 1896 and thereafter would also be issued separately in the form of reprints from the *Technology Quarterly*, repaged and provided with an index, at \$1.50 per annum. The third volume, 1897, was edited by Noyes with Talbot as Associate Editor, and was printed in the *Journal of the American Chemical Society* as "Contributed by Members of the Instructing Staff of the Massachusetts Institute of Technology." A footnote stated that "This review, which for two years has appeared in the *Technology Quarterly* and as a separate publication, will hereafter be published only in this Journal and in the *Technology Quarterly*. Copies of the two preceding volumes may be obtained by addressing the Librarian of the Massachusetts Institute of Technology, Boston, Mass." Talbot continued to serve as Associate Editor during 1898 and 1899. Noyes edited the "Review" alone in 1900, and with Alpheus G. Woodman, '97, as Associate Editor in 1901. After 1901 the "Review" was no longer printed in the *Technology Quarterly*. It continued to appear in the *Journal of the American Chemical Society*, but now under the editorship of William A. Noyes with the help of an entirely new set of abstracters, and in 1907 *Chemical Abstracts* commenced as a separate journal.

Professor Forris Jewett Moore was a graduate of Amherst College in the class of 1889. He went to the

University of Heidelberg where he studied with Victor Meyer and with Gattermann, carried out under the direction of the latter his doctor's research on the isolation of the aromatic sulfonic acids, and was awarded the Ph.D. degree in 1893. He spent one year as Instructor at Cornell and then came to the Institute where he served as Assistant Instructor, and Assistant Professor of Analytical Chemistry from 1894 to 1904, and then as Assistant Professor, Associate Professor, and Professor of Organic Chemistry, 1904 to 1925, being for many years in charge of undergraduate instruction in the latter subject. Students regarded him as the most facile and brilliant lecturer at the Institute. He employed research assistants and attracted to the Institute some of the first graduate students who specialized in organic chemistry. His research papers show throughout that mastery of innumerable detail which is necessary for pioneer work in structural organic chemistry. He published "Outlines of Organic Chemistry," 1910, "Experiments in Organic Chemistry," 1911, and "A History of Chemistry," 1918.

The Research Laboratory of Organic Chemistry, organized in 1926 with Professor James F. Norris as Director, has published 81 papers to the end of 1932. The Research Laboratory of Inorganic Chemistry, organized in 1930 under the directorship of Professor Walter C. Schumb, has published 24. The three Laboratories for graduate research are housed in the new George Eastman Research Laboratories. (Concluded on page 272)



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CHEMISTRY AT M. I. T.

(Concluded from page 271)

The present staff of the whole Chemistry Department consists of ten Professors (of which one is non-resident), seven Associate Professors, five Assistant Professors, 16 Instructors, five Research Associates, 14 Assistants, and seven Research Assistants. In the course of its history to June 1932, the Institute has awarded 253 Doctor's degrees (Ph.D. and Sc.D.); 109 of these have been in Chemistry and, the next largest group, 31, in Chemical Engineering.

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P E R S O N N E L

The Division maintains a Personnel Office to assist graduates in finding suitable positions and to aid industry in locating graduates of specified qualifications.

Mr. John M. Nalle, VI, '20, has recently been added to the staff of the Personnel Office to increase the effectiveness of this work.

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MASSACHUSETTS INSTITUTE *of* TECHNOLOGY
CAMBRIDGE

M. I. T. NEWS BULLETIN

PREPARED BY JOHN J. ROWLANDS, DIRECTOR, INSTITUTE NEWS SERVICE

Adventure in Alaska

Methods of measuring and studying the nature of cosmic radiation and the adventures of the expedition which last summer went to Alaska to measure the intensity of cosmic rays at high altitudes were described by Dr. Ralph D. Bennett, of the Department of Electrical Engineering, and Edward P. Beckwith '01, at the recent meeting of the Alumni Council at Technology.

Mr. Beckwith, a member of the Explorers' Club, was on the ill-fated expedition to Mount McKinley, and was with Dr. Bennett when the latter led a second expedition to complete the observations interrupted by the tragic deaths of Allen Carpe and Theodore Koven. Mr. Beckwith described the trip to Mount McKinley by airplane and the difficulties of landing on and taking off from the surface of the Great Muldrow Glacier. He reconstructed the accident which resulted in the death of Carpe and Koven, described the finding of Koven's body (Carpe has not yet been found), and recounted other adventures experienced by Carpe's party and subsequent groups in attempting the ascent of Mount McKinley. He showed many colored slides, among them a notable series of pictures taken by Carpe and Koven and found in their camp after their death. Other pictures taken by Mr. Beckwith himself showed the nature of the Alaskan country, the camps on Mount McKinley, and the planes used in the expedition. He concluded by showing photographs of the Bennett expedition and return trip from Alaska to Seattle.

Dr. Dewey on Arbitration Board

Professor Davis R. Dewey, Head of the Department of Economics and Statistics, recently served as member of a board of arbitration in a dispute involving the Illinois Central Railroad and the Order of Railway Conductors and the Brotherhood of Railroad Trainmen.

Dr. Dewey was appointed to this post by the United States Board of Mediation, and attended proceedings of the case in Chicago.

189 Enroll in Free Courses

The program of free courses conducted by the Institute for unemployed engineers and architects during the first term is being continued during the second semester, with the addition of six new subjects.

The success of this educational service is indicated by the enrollment this term of 189 professional men from various fields of science and engineering.

The Honors Group

Selection of five juniors for membership in the honors group of the Department of Electrical Engineering has been announced. The students who, by merit of scholastic ranking and proven initiative, are thus entitled to undertake a special curricular program are: Constant W. Chase, Jr., Newport, R. I.; Robert N. Eck, Lake Mills, Wis.; Miles Van V. Hayes, Greenwich, Conn.; Wilcox P. Overbeck, Denver, Colo.; and Sherman K. Shull, Chicago, Ill.

Under the honors group plan of this department, responsible students of excellent scholastic standing are allowed considerable freedom from attendance at classes and from the routine of detailed assignments. Each honors student works very much on his own initiative, under the advice and guidance of staff members. The arrangement permits greater opportunity for collateral reading, and is designed to encourage originality, intellectual courage, and self-reliance.

Architectural Medal

Royal Barry Wills, a graduate of the Department of Architecture at the Institute in the Class of 1918, was recently awarded the gold medal for the best small-house design submitted in the 1932 national competition sponsored by Better Homes in America. Presentation of the medal was made by President Hoover as honorary chairman of the organization. Miss Elizabeth Coit '19 was one of seven architects who received honorable mention in the contest.

In awarding the medal, the jury declared that "the house submitted by Mr. Wills shows great charm, expresses the spirit of the locality in which it is built, has a fine scale and composition, and shows a good use of materials. It has an air of domesticity and shows great care in the manner in which all detail has been brought together."

Exhibits for Students

A weekly series of laboratory exhibits, illustrating for teachers and students of New England's preparatory and high schools recent achievements in research, is now under way at Technology. These exhibitions opened on February 11, and will be held each Saturday afternoon from 2 to 5 p.m. until April 29.

The demonstrations, planned in response to many expressions of interest in the progress of research at the Institute, are designed to illustrate to secondary school instructors and students interesting trends in modern science and engineering.

The program of exhibits includes recent developments in the fields of physics, architecture, naval architecture, geology, biology and public health, business and engineering administration, modern metallurgy, chemistry, engineering computing machines, and electrical, aeronautical, civil, and mechanical engineering.

Textile Course for Executives

An intensive six weeks' course in research for executives and research directors of textile mills opened at the Institute on March 24. The course, which is specially designed for laboratory men, mill agents, and overseers who wish to keep in touch with current technical developments in their field, is conducted on Friday and Saturday of each week for a limited group.

The course is under the joint direction of George B. Haven '94, Professor of Advanced Machine Design, and Edward R. Schwarz '23, Assistant Professor of Textile Technology. The session includes a series of lectures by Professor Haven on the physical testing and analysis of textiles by means of mechanical devices, and another series by Professor Schwarz on the theory and practice of textile microscopy.

Important new additions to the equipment of the Institute's textile laboratory have made possible advanced laboratory research during the session.

The course is the eleventh of its kind to be held at Technology in the past four years.

Faculty Party

The midwinter party of the Faculty Club took place on February 14 at the Commander Hotel in Cambridge. Following a dinner, Professor Dean Peabody, Jr., '10 spoke on "Mountaineering Vacations," and Miss Miriam E. O'Brien gave an address on "Manless Climbing."

The executive committee of the Faculty Club, which had charge of arrangements, includes Professor Murray P. Horwood '16, Chairman; Professors Frederick K. Morris, Robert C. Eddy, Karl L. Wildes '22, Arthur C. Hardy '18, Dean M. Fuller, and Leicester F. Hamilton '14.

The Future of Fuels

Prediction that the use of oil and gas for energy production in the United States will double during the next 20 years, while the use of coal will continue to decline, was made by Professor W. Spencer Hutchinson '92 at the annual convention of the American Institute of Mining and Metallurgical Engineers in New York.

Professor Hutchinson, who is Head of the Department of Mining and Metallurgy at Technology, based his conclusions on a recent statistical survey made in collaboration with August J. Breitenstein on the competitive relation of coal and petroleum in the United States. The study included a determination of the total effective energy demand of the country from 1850 to date and a forecast to 1950, from such sources as coal, petroleum, natural gas, natural gas gasoline, and hydro-power.

Thirty years ago, he said, 91% of the country's horse power came from coal, and only four per cent from oil and natural gas. In 1930, horse power derived from coal had dropped to 60%, while that from gas and oil had risen to 31%. By 1950, Professor Hutchinson estimates, coal will be furnishing but 46.6% of the nation's power.

Dr. George B. Waterhouse, Professor of Metallurgy, discussed "Steel Making Processes" in the Howe Memorial lecture which he delivered before the society's iron and steel division. In a symposium on nonferrous metallurgy, Professor Carle R. Hayward '04 and Royal B. Jackman presented a paper on "Forms of Copper Found in Reverberatory Slags." Professor Charles E. Locke '96 is chairman of the organization's committee on milling methods.

Among other members of the department staff who attended the convention were: Professors Horace T. Mann '25, Edward E. Bugbee '00, Franklin L. Foster '25, Robert S. Williams '02, and James B. Waterfield and Leonard W. Johnston.

Air Transportation, Present and Future

Important trends in air transportation were the topic of a series of four departmental lectures recently delivered at the Institute by Edward P. Warner '17, editor of *Aviation* and former Assistant Secretary to the Navy for Aviation. Professor Warner, who for several years was Head of the Department of Aeronautical Engineering at Technology, now holds the position of Non-Resident Professor.

In an address on "The Development and Present Status of Air Transportation," he traced recent trends in aviation in this country. There has been a substantial yearly increase in the total passenger miles flown, he said, and the miles of scheduled mail flying have shown a decided gain every year through 1931, with a slight reduction during 1932. The safety record as measured in passenger miles per fatality has improved steadily and the curve is still rising. The only foreign country with a safety record as good as that of the United States is Holland. The United States also exceeds in volume the total commercial transportation of all other countries combined, and has nearly ten times the amount of passenger transportation of its nearest competitor, Germany.

In his second lecture on air transport equipment, Mr. Warner declared the most significant developments in design at the

present time were in increased cruising speed and passenger comfort. A gain in the average cruising speed of transport planes from about 100 to 140 miles an hour has been effected in the past few years. Improvements in comfort center largely around more adjustable seats, better ventilation, and better noise insulation in the cabin.

The influence of airplane design on the economics of air transportation was discussed in the third lecture, in which Professor Warner stressed the relation of speed, safety, convenience, the size of the plane, and the frequency of its schedule.

In a final address on the future prospects of air transportation, Mr. Warner predicted that in the next ten years airlines would handle ten per cent of the total long distance passenger travel in the United States and would be self-supporting, without government subsidy in the form of mail contracts. The carrying of mail by air should have a steady growth, he said, depending somewhat upon legislation. Air express will handle a relatively insignificant volume of the total amount of goods shipped, but may be an important feature of our air transportation system for shipments of an emergency nature.

Aldred Lectures

In the third Aldred Lecture of the year, C. F. Merriam, general engineer of the Pennsylvania Water and Power Company, on March 17 discussed "Changing Conceptions in Hydraulic Engineering."

On April 7, C. F. Hirshfeld, Chief of Research at the Detroit Edison Company, will give an address on "Straight Thinking." Raymond M. Hood '03, the distinguished New York architect, will deliver the final Aldred Lecture on April 28, in which he will give an illustrated description of "Rockefeller Center."

The Navy of the Air

The part that naval aircraft play in modern warfare, their effectiveness in aerial attack, and methods of launching and landing airplanes on ships, were described by Commander Henry E. Russell, Professor of Naval Construction, in the third Society of Arts popular science lecture at the Institute.

Taking as his subject "The Navy of the Air," Commander Russell explained the use of aircraft for scouting at sea and in laying smoke screens to hide the maneuvers of surface ships. With the aid of slides he showed the operations of naval bombing planes and the launching of torpedoes from airplanes, and described their value in spotting gunfire at targets far beyond the vision of the gun crews on the surface ships.

In a spectacular motion picture film, the audience saw the bombing of the ex-German dreadnaught *Ostfriesland*, which was used as a target to test the effect of bombs ranging in weight from 230 to 2,000 pounds. The ship was sunk by large bombs dropped close alongside.

A comparatively new method of attack by planes, known as "diving bombing," was described. Here a fleet of small, fast planes approach their quarry from a tremendous height, perhaps above the clouds, and at a given signal dive directly for the enemy ship, at a speed of some 300 miles an hour. When directly over the vessel, they zoom up and drop light bombs before making good their escape.

The anti-aircraft guns carried by our newest cruisers are highly accurate and rapid, Professor Russell declared. Shells can be made to explode after they have traveled a predetermined distance through the air, making it possible to force approaching aircraft to pass through successive "curtains" of exploding projectiles. To avoid anti-aircraft fire and to make bombs penetrate the heavy protective deck of a modern capital ship, bombing attacks from seaplanes must now be made from a height of 8,000 to 10,000 feet.

No thoroughly practical solution has yet been found, Commander Russell stated, to the problem of landing planes on rough water. Seaplanes are not infrequently injured by moderately rough seas, and although efficient means have been developed for getting planes aloft, there are as yet none for getting them back on board ships other than specially designed airplane carriers. He described various types of airplane carriers, pointing out their weakness both in offense and defense, as well as the extreme fire hazard from gasoline.

In a discussion of the control and effects of gun fire, he declared that planes on a battleship would have to be sent into the air before a hostile encounter lest they be damaged by the blast of the ship's own guns. So severe is the concussion of large guns that adjacent decks may be bent, air ports blown out, and nearby light parts destroyed.

In order properly to evaluate the place of aircraft in the navy, they must be considered as a unit of the fleet upon whose tactics their operations depend, said Commander Russell. He went on to describe various types of surface ships and their distinguishing characteristics and uses, illustrating his remarks with models. He emphasized the great offensive and defensive power of the battleship, "the backbone of the fleet," and discussed the comparative strength and speed of battle cruisers, light cruisers, and destroyers.

Notes from the President's Office

President Compton during February was guest speaker at numerous civic and scientific gatherings in Massachusetts and New York. As a member of Governor Ely's special commission on the stabilization of employment, he devoted much time to explanation of that body's recommendations, and to the discussion of other social problems in which he has been actively interested.

As one of the principal speakers at a recent conference held by the Greater Boston Federation of Churches, Dr.

Compton discussed ways of "Facing the Economic Crisis." At a luncheon meeting of the Twentieth Century Club on February 20, and again before the Boston Branch of the American Association of University Women on March 1, he outlined plans for employment stabilization.

The new spectroscopy laboratory of the Institute was the topic of an address before the Optical Society of America at Rochester on February 7. Earlier in the month he spoke before the Merchant Marine Club of Boston on the work of the Department of Naval Architecture at Technology.

On February 16, Dr. Compton addressed members of the Plant Engineers' Club, and was guest speaker at a dinner of the Commercial Merchants' Club the following week. He took active charge of arrangements for a recent science evening at the Algonquin Club, and attended the meeting of the American Physics Society held in New York on February 23, 24, and 25.

Gliding at Technology

With the purchase of a high-performance Hallerhawk sailplane by members of the Aeronautical Engineering Society

at the Institute, gliding is expected to again become the significant activity which ten years ago enabled Technology to take first place at the third international meet at Wasserkuppe, Germany.

Instruction in the science of motorless flight is being given by members of the staff of the Department of Aeronautical Engineering, among them Dr. Karl O. Lange, a member of the meteorological division and a veteran of the early German glider meets. His knowledge of atmospheric conditions and the available air currents for motorless flights contributed much to the success of the

(Concluded on page XXIV)

COMPARATIVE SCHOLASTIC STANDINGS OF FRATERNITY AND DORMITORY UNDERGRADUATE GROUPS AT M. I. T. (as of end of First Term, 1932-1933)

Comparative Standing (based on February '33 ratings)		Increase over June '32	Increase over Feb. '32
Fraternity Seniors.....	3.28	*0.167	0.092
Dormitory Seniors.....	3.46	0.02	0.27
Fraternity Juniors.....	3.08	*0.055	0.113
Dormitory Juniors.....	3.29	0.02	0.19
Fraternity Sophomores.....	3.02	*0.014	0.165
Dormitory Sophomores.....	3.27	0.11	0.20
Fraternity Freshmen.....	2.95	0.163	0.185
Dormitory Freshmen.....	3.16	0.07	0.10
General Average..... (Fraternity)	3.07	*0.03	0.16
General Average..... (Dormitory)	3.29	0.06	0.20

FRATERNITY SCHOLASTIC STANDINGS

Comparative Standing of 25 Chapters (based on February '33 ratings)	Increase over June '32	Increase over Feb. '32	Comparative Standing of 25 Chapters over previous five-year period	Comparative Standing of Freshmen of 25 Chapters	Rating Feb. '33	Comparison with Chapter Rating
1. Phi Beta Delta.....	3.87	0.25	0.653	1. Phi Kappa Sigma.....	3.91	+0.71
2. Chi Phi.....	3.51	0.29	0.60	2. Phi Beta Delta.....	3.85	-0.02
3. Beta Theta Pi.....	3.34	0.15	0.127	3. Chi Phi.....	3.43	-0.07
4. Kappa Sigma.....	3.28	*0.08	0.20	4. Theta Xi.....	3.33	+0.49
5. Phi Kappa Sigma.....	3.20	0.19	0.25	5. Kappa Sigma.....	3.24	-0.04
GENERAL AVERAGE, ALL UNDERGRADUATES.....	3.17	0.06	0.18	6. Sigma Chi.....	3.17	+0.17
6. Alpha Tau Omega.....	3.17	*0.06	0.315	7. Phi Gamma Delta.....	3.14	+0.105
7. Phi Sigma Kappa.....	3.14	*0.18	0.303	8. Beta Theta Pi.....	3.13	-0.21
8. Lambda Chi Alpha.....	3.12	*0.12	0.314	9. Delta Kappa Epsilon.....	3.09	-0.02
9. Delta Kappa Epsilon.....	3.11	0.28	0.51	10. Phi Beta Epsilon.....	3.03	-0.043
10. Theta Delta Chi.....	3.09	*0.04	0.02	11. Delta Psi.....	3.02	0.00
11. Theta Chi.....	3.08	0.05	0.142	GENERAL AVERAGE, ALL FRESHMEN.....	2.99	
12. Phi Beta Epsilon.....	3.073	0.153	0.20	GENERAL AVERAGE, FRATERNITY FRESHMEN.....	2.95	
13. Delta Upsilon.....	3.072	0.192	0.315	12. Sigma Alpha Mu.....	2.94	+0.09
AVERAGE ALL FRATERNITY MEN.....	3.07	*0.03	0.16	13. Alpha Tau Omega.....	2.92	-0.25
14. Phi Mu Delta.....	3.064	*0.006	0.134	14. Phi Delta Theta.....	2.92	-0.094
15. Phi Gamma Delta.....	3.035	*0.095	0.159	15. Delta Upsilon.....	2.90	-0.172
16. Sigma Alpha Epsilon.....	3.03	*0.25	*0.19	16. Sigma Alpha Epsilon.....	2.89	-0.14
17. Delta Psi.....	3.02	*0.13	0.202	17. Theta Delta Chi.....	2.86	-0.23
18. Phi Delta Theta.....	3.014	*0.036	0.159	18. Sigma Nu.....	2.80	-0.21
19. Sigma Nu.....	3.01	*0.04	*0.04	19. Phi Sigma Kappa.....	2.53	-0.61
20. Sigma Chi.....	3.00	*0.21	*0.062	20. Phi Mu Delta.....	2.49	-0.574
21. Delta Tau Delta.....	2.86	*0.06	0.105	21. Theta Chi.....	2.48	-0.60
22. Sigma Alpha Mu.....	2.85	*0.14	0.17	22. Delta Tau Delta.....	2.45	-0.41
23. Theta Xi.....	2.84	*0.11	0.241	23. Phi Kappa.....	1.96	-0.33
24. Phi Kappa.....	2.29	*0.27	*0.442	24. Lambda Chi Alpha.....	1.84	-1.28
25. Phi Iota Alpha.....	2.26	*0.73	*0.25	25. Phi Iota Alpha.....	No Freshmen	

* Decrease

NEWS FROM THE CLUBS AND CLASSES

CLUB NOTES

M. I. T. Club of Central New York

Our club held a most enjoyable meeting at the University Club, February 24, at which we were honored by having as our guest Dr. Allan Winter Rowe, President of the Alumni Association. Several of our members had been fortunate enough to have had previous contacts with Dr. Rowe while they were at Technology. To these members of our club the meeting presented a welcome opportunity to renew an old friendship and to the other members, to make the acquaintance of one of Technology's most faithful and valuable Alumni.

After giving a sketch of some of the more important developments at the Institute itself, Dr. Rowe talked upon the solidarity of the Alumni. He described the new methods of election proposed for the Alumni Association, and pointed out the important part which each group of Alumni was to play in the proposed arrangement. Every individual present began to realize more keenly his duty in being active and thinking as an alumnus. The importance of our individual club as a part of the Alumni Association was far more keenly realized.

Those present at the dinner were: H. W. Jordan '91, C. S. Glenn '03, F. W. Barker, Jr., '12, J. M. Hastings '13, C. K. Lawrence '24, F. S. Hungerford '24, E. C. Booth '25, L. G. Miller '27, W. G. Bowie '29, and G. R. Eddy '32.

The following officers were elected for the ensuing year: President, Edward C. Booth '25, succeeding J. Murray Hastings '13; Secretary and Treasurer, Fred S. Hungerford '24, succeeding Frederick W. Barker, Jr., '12. Mr. Barker was elected Honorary Secretary. — FRED S. HUNGERFORD '24, *Secretary*, 1804 West Genesee Street, Syracuse, N. Y.

Technology Club of Chicago

The Technology Club of Chicago did not have to go outside Technology's ranks for a speaker at its annual meeting on February 8 at the Medical and Dental Arts Club, Chicago. None other than the gifted President of our Alumni Association, Dr. Allan W. Rowe, was our guest and speaker of the evening. Dr. Rowe told of the activities at the Institute and of the work of the Alumni Association. The address was delivered with such finesse and subtle wit that the 35 alumni present (who came in spite of 15° below zero temperature) would not have missed the meeting even if the elements had been more severe. The Chicago Club feels

that with Dr. Rowe in the saddle there should be new life injected into the Alumni Association.

The meeting was in charge of former Secretary Lloyd C. Cooley '11 in the absence of former President John A. Plimpton '22, who has moved to New York.

Lonsdale Green '87, chairman of the nominating committee and one of our most loyal members, presented a slate of officers for 1933. The following were unanimously elected: President, Lloyd C. Cooley '11, X; Vice-President, G. M. Proudfoot '04, IV; Treasurer, James Eliott '25, II; and Secretary, W. I. McNeill '17, XV.

Dr. Rowe is to consider with President Compton the question of having some kind of a Technology exhibit at the Century of Progress World's Fair in Chicago this summer. The Chicago Club hopes that it may have the pleasure of welcoming many Technology men to this exposition. — W. I. McNEILL '17, *Secretary*, c/o Colgate-Palmolive-Peet Co., 919 North Michigan Avenue, Chicago, Ill.

Technology Club of Lake Superior

In attempting to report the recent meeting of our club which did not take place, the Secretary is prone to wander into the realm of poetry: "What matter how the night behaved? What matter how the north wind raved? Blow high, blow low, not all its snow" could quench the zeal of President Rowe. (With apologies to Whittier and Dr. Rowe.)

Our club may not hold a record for frequent activity, but on occasion it can come to the front in full force. Such an occasion presented itself in the advice from Alumni Secretary Locke that Dr. Rowe would visit us on February 9; that he would come by airplane; that the difference in standard time between arrival and departure would be 143 minutes, and that said time could be apportioned as the committee saw fit.

Air travel still holds an element of novelty for most of us, but such travel — in the depths of a northern winter — also adds the glamour of adventure and perhaps the suggestion of caution in asking, "What matter how the north wind raved?" What matter? We shall see.

We prepared to make the most of our visitor's fleeting visit. We planned to meet him, dine him, listen to the latest of Technology's achievements and the last atomic theory — of which Charlie Cross, of revered memory, probably never even dreamed — and speed him on his way.

"What matter how the night behaved?" Aye, there's the rub. One element we had overlooked: the Divinity that shapes our ends. There is also a

Divinity that sits in judgment on Duluth's rocky slopes, silent and self-effacing, but ever watchful of Nature's moods, ever interpreting her signals, ever passing judgment on the conditions that will prevail tomorrow.

To err is human; to forget, unpardonable. And we forgot. We forgot to make arrangements with the Weather Man. Looking back, we can imagine that dignitary conferring with himself: "What ho? Will this invader from the far-off M. I. T. presume to trespass upon my domain with neither leave nor license? I'll test what 'gentlemen of blood and quality' is this. I'll try the argument of a wintry blast at minus 26°, then 28, then two times minus 32, and on the ninth. . . ." Here we leave the realm of fancy to quote from the records: "Chicago, Ill. Greatly regret that uncertainty of weather compels cancellation of Duluth visit, February 9. Shall plan visit during next western trip. Greetings and regrets to Technology Alumni. A. W. Rowe."

We, too, regret the outcome of Dr. Rowe's plans, but must bow to the inevitable and look forward to that "next western trip" in a season more conducive to enjoyment on the shores of Gitche Gume. And the oldest inhabitant says . . . but that is another story. — FRANK HAYES '90, *Secretary*, 614 Woodland Avenue, Duluth, Minn.

M. I. T. Club of Western Maine

A very interesting meeting of the club was held in the Sunrise Room of the Eastland Hotel on the tenth of February. The principal speaker was Dr. Vannevar Bush, Vice-President of the Institute, who spoke on the subject of "Mathematics by Machine." He described in detail the differential analyzer, which has been developed by the Department of Electrical Engineering under his supervision. This machine makes possible in a few hours the solution of intricate differential equations which would otherwise consume weeks and months of arduous labor by skilled mathematicians. And the accuracy of the solution is surprising. Dr. Bush explained by the use of slides some of the mechanical features of the machine, and prophesied the development, within the next ten years, of some amazing machines for the solution of the problems of higher mathematics and physics, if scientific research and development is allowed to continue unimpeded at the Institute.

Dr. Bush was accompanied to Portland by Professor Charles E. Locke, Secretary of the Alumni Association, who spoke concerning the present condition of affairs at Technology, and after giving the news about student activities, talked at length on the budget.

James C. Boyd '93, of Portland, presented the matter of legislation for the licensing of engineers in the State of Maine. This is a subject that is to be considered at a meeting of the Maine Association of Engineers later in the month. After some discussion, the following resolution was passed: "Resolved, that it is the opinion of the M. I. T. Alumni Association of Western Maine that the Maine Association of Engineers should look to the protection of the engineer, in the event that a licensing law for engineers is introduced in the State Legislature, by seeing to it that the proposed law conforms to the uniform law recommended by the Founder Societies."

The President announced that the following officers would serve the association for the coming year: President, Orville B. Denison '11, of Douglas Hill; Vice-President, Donald O. Hooper '15, of Portland; Secretary and Treasurer, Alfred E. B. Hall '15, of Portland; Executive Committee, Lewis D. Nisbet '09, of Portland, and Stanley W. Hyde '17, of Yarmouth; Representative to the Alumni Council, Walter H. Norris '93, of Portland.

One of the largest turnouts in years attended the dinner, there being 47 present, with delegations from Augusta, Lewiston, Westbrook, Biddeford, and Sanford. We were also glad to welcome George R. White of Lynn, Mass.

Plans had been made to visit the German passenger liner *Dresden* on the previous evening, February 9, through the courtesy of North German Lloyd and their agents, John G. Hall and Company, Inc., of Boston, of which concern Earle F. Hiscock '32 is the manager of the Portland office. Due to fog en route, however, the *Dresden* did not arrive in port in time for the visitation. — ALFRED E. B. HALL '15, *Secretary*, 51 Thomas Street, Portland, Maine.

The M. I. T. Club of Western Pennsylvania

On February 23, 1933, the club assembled at the University Club, Pittsburgh, Pa., at 6:30 P.M., for its regular monthly meeting. An informal buffet dinner was served, including, among other delicacies, sauerkraut, pigs' knuckles, and beer.

Professor Marion McCabe of the School of Business Administration, University of Pittsburgh, was our guest speaker. He spoke briefly on present economic trends and the hope of recovery.

Following his talk, there was an informal open discussion led by Professor McCabe. This, under his able guidance, became a most illuminating and instructive forum.

When the world's ills had been thoroughly administered, the bridge tables were brought out and the party ended with our usual social good time. Approximately 30 members were present. — SAMUEL J. HELFMAN '24, *Secretary*, 435 Sixth Avenue, Pittsburgh, Pa. C. M. BOARDMAN '25, *Assistant Secretary*, Duquesne Light Company, Pittsburgh, Pa.

CLASS NOTES

1877

I was recently informed of the death of Charles S. Bachelder, of Napa, Calif., who died July 18, 1932. A letter from George W. Kittredge, dated December 9, 1931, gave the following account of his visit to Bachelder at Napa.

"His ranch is about 25 miles from Petaluma, where I am staying with my son-in-law and daughter and we had no trouble in finding him. I should never have recognized him as anyone I had seen before, and even at the end of the interview, I could not recall anything that was familiar. He said that '78 was really his class but because he took only three years to complete his course, he was classed with three or four different years. He graduated in chemistry. He told me he was born in Eagleville, Conn., on February 18, 1859, and was 19 when he graduated. Eagleville is now called Versailles. He left for the West two days after graduating. He spent two years in Colorado, in the saddle most of the time. His father located in Napa and established a cotton and woolen mill and became interested in beet sugar production. Charles went there to make practical use of his chemistry in treatment of oils and sugars. Later and for ten years he was with the Pacific Bank of San Francisco with special interest in gas works in which the bank people were interested. Then he was with a lumber company for a year and then in charge of the research laboratory for the Spreckels Beet Sugar Company for 17 years, having at one time 48 men under him in laboratory work.

"He was on a ranch of 500 acres, finely situated to overlook the Napa valley. His house, with all his accumulated records, notebooks, and personal valuables, was burned last May and he lives in a single room in a shack hastily erected after the fire and occupied by his hired farmer and family. He hopes to sell his land for high-grade residences, it being about a mile from the center of the town. To me, it looked like a forlorn outfit. He said the loss due to the fire had badly shaken him. He appeared very glad to see me and hoped I would call again and said that he should like to attend some of the class reunions but doubted if he ever would now. He said he felt well. He was out in the fields plowing when we rode up. He and his father have had this ranch for 50 years."

Kittredge called again to see him this year, but found he had passed away. As he was unable to meet his administrator, I wrote and received the following reply: "Mr. Bachelder, whom I knew for many years, died in this county about the 19th day of July, 1932. He was a man well respected in the community and bore a good name. Mr. Bachelder left surviving him three children; namely, Hazel M. Wilhelm, 2360 Pacific Avenue, San Francisco, Alice L. Resing, 71 Toledo Way, San Francisco, and Robert B. Bachelder, 499 Marina Boulevard, San Francisco. Mr. Bachelder and the mother

of these children were divorced and he never remarried. His daughters are very estimable ladies. Mr. Bachelder left quite a large acreage of land situated near Napa which has been appraised at about \$20,000, but he was heavily involved and it is doubtful whether there will be much left after all demands are paid off." — BELVIN T. WILLISTON, *Secretary*, 3 Monmouth Street, Somerville, Mass.

1884

The Secretary notes with regret the decease on February 3 of Mary E. Fitch, wife of Alfred L. Fitch of West Roxbury. Mrs. Fitch was the daughter of John A. and Susan (Earl) Foy of North Easton.

Chase, Puffer, and Gill enjoyed the Alumni Dinner very much. — AUGUSTUS H. GILL, *Secretary*, Room 4-053, M. I. T., Cambridge, Mass.

1888

During the first two months of this year the Class lost two of its outstanding and best-known members. On January 20 William T. Keough passed away and on February 13 William H. Blood, Jr. Both graduated from the Institute with honors and were very popular with their classmates and both achieved remarkable success in their chosen professions. Harry Blood, as his classmates knew him, was born in Charlestown and graduated from the Newton High School in 1884. After graduation from Technology he went with the Thomson-Houston Electric Company in Lynn, then successively with the H. W. Thomson Company of St. Paul, Minn.; Franklin Electrical Company of Kansas City, Mo.; and Chase-Shawmut Company of Boston. In 1894 he joined the forces of Stone and Webster and held the position of Vice-President of the Engineering Corporation from 1897 until his death. During the Great War he was assistant to the President of the International Shipbuilding Corporation at Hog Island, Philadelphia. He was President of the National Electric Light Association and Electric Vehicle Association of America, and a member of the Illuminating Engineering Society, American Society of Electrical Engineers, National Fire Protection Association, National Conference on Standard Electric Rules, and a lecturer on Public Utilities at the Harvard Graduate School of Business Administration.

Blood was very much interested in the affairs of the Town of Wellesley, where he had made his home for the last 25 or 30 years of his life. He was chairman of the Water and Municipal Light Commission and also of the Sewer Commission. He was a member of the Exchange Club of Boston and the Lawyer Club of New York. In his position with Stone and Webster he had, for the last few years, been in personal charge of the appraisal of some eight billions of dollars' worth of properties. He was a national authority on street railways and public utilities. His death was very sudden from a heart attack while attempting to start his motor car after dining with Mrs. Blood and friends at the Myles Standish Hotel,

1888 Continued

Back Bay, Boston. He leaves his wife, the former Grace Maria Nathan, one son, and two married daughters. In attendance at the funeral services were representatives of Stone and Webster, selectmen and members of the commissions of which he was chairman, and seven members of our class: Stone, Webster, Sawyer, Buttolph, Runkle, Sweetland, and Williams. More than 300 persons attended. Memories of his engineering accomplishments and friendly companionship will linger with us for years to come.

Billy Keough, as his classmates called him, was one of the most popular men in the class, starting with his winning of first prize for "individual drill" at the final exhibition drill and grand ball in Mechanics Hall at the close of freshman year. He was born in Boston and after graduating from the special course in Marine Engineering and Naval Architecture, taking post-graduate courses and lecturing at Technology, he entered the employ of the Atlantic Works in East Boston and remained there nine years, the last five years as chief engineer. For the next ten years he carried on work in his own private office as consulting engineer in marine engineering and naval architecture. Then he was elected a member of the Boston School Committee and from 1907 to 1924 held the position of business agent for the school board, establishing modern and efficient business methods. He was appointed a member of the Boston Finance Commission by Governor Allen in 1930 and held that position till his death.

He was a member of the American Society of Mechanical Engineers, the Society of Naval Architects and Marine Engineers, the American Society of Marine Engineers, the Charitable Irish Society, and President of the Catholic Alumni Sodality. He was a trustee and member of the board of investment of the Home Savings Bank and a director and Vice-President of the Enterprise Coöperative Bank. He is survived by his wife, who was Rose Butler of Boston, two sons, Paul and John, and a daughter, Katherine. St. Theresa's Church, West Roxbury, was filled at the funeral services. President Sawyer and your Secretary were given seats in the front row of business and society associates, of which there were over 50 present.

He never missed a gathering of the Class and, although not physically able, he attended the last meeting of the committee on the Forty-Fifth Reunion, of which he was a member, shortly before his final sickness. His lovable character will be remembered by his classmates always. As a final tribute to Keough's memory, we give a portion of an editorial in a recent issue of the *Boston Herald*: "It was his work during 17 years in connection with our public school system, for which he will long be remembered. As business agent of the school committee, he manifested day in and day out the qualities of conscientious devotion to duty, scrupulous zeal in running down every detail of a complex organization, and absolute probity, on which one who

observed his work at close range based his opinion that Mr. Keough was 'a unique civic figure.'"

Members of the Class attending the Alumni Dinner of the Alumni Association at the Hotel Statler on February 4 were: Bates, Bridges, Collins, Connor, Horn, Sawyer, and Wood. Webster was prevented from attending at the last moment.

We have recently received a clipping from the Portland (Maine) Press *Herald* showing Colonel Charles P. Nutter, fire chief of the Scarborough (Maine) Fire Department, standing with his firemen in front of a newly purchased piece of fire-fighting equipment. Colonel Nutter is proprietor of a 300-acre dairy farm, the largest and most successful in the suburbs of Portland.

Our classmate, George Lee, has blossomed forth as a playwright. He wrote the lines for a minstrel show in his home town and used his 48-year-old M. I. T. drill cap as part of the uniform of a Western Union messenger who dashed on to the stage at a certain point in the play. "What are you doing with a Tech cap on?" asks the interlocutor of the boy, and the boy replied, "Why, don't you know that you have to be a 'technical graduate' in order to get a job as 'messenger boy' now-a-days?"

Mrs. William G. Snow, wife of our late-lamented Secretary, left Newton Center for her annual sojourn in Florida early in January.

Ben Buttolph writes from Providence about his recent visits to classmates, and notes that two of our best men have gone and hopes no more will be called before the June Reunion. This causes the Secretary to suggest that all classmates who read this be sure to start making their plans at once to attend our Forty-fifth Reunion at Rockport, Mass., June 9 to 11, because we don't know what will happen before our Fiftieth Reunion.

Charlie Sabine, whom we all remember as the tall and handsome 1st Sergeant of Company A, Corps of Cadets, has the best "personally operated garden" in Duxbury, Mass. Charles is one of the most active gardeners we know and is planning to go to Rockport and tell the rest of us all about the fine art of gardening.

I'm sure you remember the rosy-cheeked John Sully who graduated in Mining Engineering in '88. We have just learned that he has annexed the Nevada Consolidated Copper Company to his Chino Mines in Hurley, N. M., where he has been a copper magnate and engineer for a long period of years. We feel sure that Johnnie is planning to come up to Rockport in June and will guarantee cooler and more humid weather there than if he should stay in New Mexico. Your Secretary spent a summer in El Paso once with the temperature 110° and humidity 8%, so we know whereof he guarantees.

Mr. and Mrs. Johnnie Runkle spent a week-end recently with President Alfred Sawyer at his homestead and ranch in Concord, Mass., where Prexy is engineer-

ing the scientific removal of the largest white birch tree in Concord from the ground in front of his mansion because said birch has passed its period of usefulness as an ornamental tree.

Your Secretary made quite a lengthy visit to Cleveland in February and March at the homes of his daughters, Dorothea and Katharine (now Mrs. M. L. McCandless, Jr.) not to mention his granddaughter, Katharine, 4th, who is a good example of "why gentlemen (especially grandfathers) prefer blondes."

While on this visit he drove down to Akron and called at the magnificent estate of our classmate, Frank H. Adams, former Treasurer of the Goodyear Tire and Rubber Company and Vice-President of the Second National Bank of Akron, and found that he was "deep sea fishing" at Miami, Fla., and expected to fly back to Akron with his friend, Mr. J. A. Sweizer, about the first of April. We understand that Adams keeps young by golfing, fishing, and flying, which may offer a suggestion to some of us as to the means of enjoying eternal youth. We hope Adams will come to Rockport in June and tell us all about it.

Our class champion of champions, Walter Shaw, also premier yachtsman, has been laid up in dry dock (hospital) this winter, but after a thorough overhauling with replacement of some worn parts is now out and about better than ever.

Soon after you read this, all you '88 men, '92 in number, will receive a letter from the Secretary going into the minutest details of the grand blow-out at Rockport, June 9 to 11, inclusive, with complete programs for each day (optional in part or entirely), with a postcard enclosed for use in advising that you will be there without fail or otherwise if absolutely necessary. You can't afford to miss it even if you have to travel by bus (which is not as bad as it's painted, we understand), for if you don't come to the Forty-Fifth, maybe you can't come to the Fiftieth. "A bird in the hand. . . ." "A word to the wise. . . ." Whether you come by airplane, railroad, bus, or on foot, be sure to come. This will be the last ballyhoo printed in *The Review*, so send in your "yes" and come and have the time of your young life. — BERTRAND R. T. COLLINS, Secretary, 25 Bennington Street, Newton, Mass.

1890

At the Alumni Dinner at the Hotel Statler, February 4, there were seven of our class present: Atwood, Burley, Gilmore, Goodwin, Packard, Rogers, and Sherman. Harry Spaulding had planned to be with us, but a sudden attack of the grippe kept him at home. He is reported better now.

Elton D. Walker, Head of Department of Civil Engineering at the Pennsylvania State College, has recently published two interesting engineering articles, "Practical Suggestions for the Construction of Concrete Floors" and "Suggestion Regarding Concrete for Use on the Farm."

1890 Continued

We have received notice from the Alumni Office that Billy Poland's address is University Club, 54th Street and Fifth Avenue, New York City. Have not heard from Billy for some time, as our last letter to him was evidently missent, but shall soon drop him another line.

We are advised of the death of George L. Nelson on January 23. He was with us two or three years at M. I. T. His home was in Brookline, Mass.

The following account of William Z. Ripley's resignation as Nathaniel Ropes professor of political economy at Harvard appeared in the *New York Post*: "Few living Americans had had a more useful career or won wider recognition than William Z. Ripley. . . . An authority in two distinct fields, anthropology and economics, Professor Ripley is best known in the United States for his knowledge of railroad problems and contributions to their solution.

"The value of his services is illustrated by the number of occasions on which they have been sought by departments of the Federal Government. These include his work as administrator of labor standards in the War Department in 1918, as chairman of the National Adjustment Commission of the United States Shipping Board for the two years following, and as special examiner for the Interstate Commerce Commission from 1920 to 1923. In the latter year he prepared for the commission a railway consolidation plan which has profoundly influenced subsequent treatments of that subject.

"In retiring from the Harvard faculty, on which he has served for nearly half of his 65 years, Professor Ripley will discontinue only part of his varied activities. He will not lack for opportunities to apply his broad knowledge of economics."

The following item appeared in a recent newspaper: "George W. Fuller, an engineering pioneer in the development of water purification systems for municipalities, has been named chairman of the Engineering Foundation, the research organization for the senior national societies of civil, mining and metallurgical, mechanical, and electrical engineers.

"Fuller, a member of the firm of Fuller and McClintock, New York, was born in Franklin, Mass., attended the M. I. T., and from 1893 to 1895 was in charge of the Lawrence (Mass.) Board of Health experiment station. Since 1899 he has been adviser for filtration plants in New York, Baltimore, Washington, New Orleans, Columbus, Grand Rapids, and other cities."

On February 16, Ernest A. LeSueur from Ottawa, Canada, came out to visit your Secretary at Lexington. We then went in to the Institute and had a short visit with Dr. Compton, and a nice talk with Harry Goodwin, who showed us through some of the laboratories; also had lunch at the Walker Memorial.

Your Secretary, and Mrs. Gilmore, left March 10, for two or three weeks' visit at Tryon, N. C. Mrs. H. M. Goodwin is going with them. This will leave Harry on his own responsibility for the time

being, but we think he will be able to survive it. — GEORGE L. GILMORE, *Secretary*, 57 Hancock Street, Lexington, Mass.

1894

It is always a pleasure when old classmates and associates revisit the Institute and give us a glimpse of themselves. Last week Jim Melliush was a visitor after many years in South America. Jim was a member of '94 in the freshman year, was obliged to stay out of the Institute because of illness, if I remember correctly, and came back two years later as a member of '96, so was three years with that class, and naturally regards himself as a member of it. After that for a number of years he was engaged in various ways in this country but especially in the field of sanitary engineering. He then went to South America, where he has been engaged in consulting sanitary engineering, and has designed and put in operation a number of water purification plants as well as carrying on consultation in other sanitary lines. Probably Charlie Locke has extended the account of Jim's operations in the notes of the Class of '96. It was a great pleasure to see Melliush again, and in spite of the lapse of more than 42 years since we first met in the drill shed, I recognized him at once. It is interesting how certain characteristics of the features, especially the eyes, persist through years so that we may frequently recognize an old friend when otherwise his contour and general characteristics may be changed greatly.

A letter received recently was from Henry A. Swanton, who a number of years ago gave up active engineering and retired to his island home on the Kennebec River, not far from Wiscasset, Maine. The last time he was at the Institute was three years ago when he came up to attend the graduation of a nephew. He threatens to do the same thing this year, as another nephew is a member of the present senior class. It is always a pleasure to get Swanton's viewpoint on matters educational, political, and rural. Apparently he finds time to do a lot of really constructive thinking. Just at present he is trying to discover, as perhaps we all are, what the effect of the prohibition law has been on the young people who have grown up during its existence on the statute books. I judge he has arrived at just about as close a decision as most of us have on this point. As a father and professor, it is the Secretary's opinion that the present generation of young people is wiser than, and fully as sound as, its parents were at the same age. Swanton had other interesting comments on the state of the country and the degree of respect which we should hold for some of the financial leaders, but this is not the place to expatiate on this point.

Two other classmates who have recently dropped in to see me have been John Chapman and Nathan Cheney. With each the Secretary had a pleasant chat, and it is his hope that many others

will find opportunity to come in to either one of his offices whenever they are in the vicinity.

On my desk there is a pamphlet describing a new instrument known as the Kampometer. This is not a case of modified spelling for advertising purposes, nor is it an instrument for measurements in relation to camps, but it is described as a new instrument of extreme sensitivity for measuring radiation. Knowing this, one might guess correctly that it was devised by Charles Abbot of the Smithsonian Institution, as the field of radiation investigation has occupied an important place in Abbot's varied, busy, and fruitful scientific work.

The architects will particularly remember Charles Deitering, for whom a new address has recently been received. Deitering has had a long and successful professional career in St. Louis, and his address is now 705 North Euclid Street in that city. — SAMUEL C. PRESCOTT, *Secretary*, Room 10-405, M. I. T., Cambridge, Mass.

1895

Dear Mates: the Alumni Dinner is a matter of history, and while '95 was conspicuous with its small attendance, there were three stalwarts present: Willard Watkins, Gus Clapp, and L. K. Yoder who formed the keystone to a round table of 11 Technology men, four of '96 on our right, and four of '94 on our left. It was a jolly crowd, an excellent dinner, followed by a literary treat. We missed the ladies, but a change of arrangements occasionally is most satisfactory.

We learn from Omaha, Neb., that Henry A. Holdrege's daughter was married last fall and that he has a son in the law department of the Union Pacific Railroad. Long time since we have heard from Henry.

On January 20, our John H. Gregory spoke at the noon luncheon meeting of the Washington Society of our Alumni Association, when Harry W. Tyler, Professor Emeritus of Mathematics, presided. Gregory's subject was "The Engineer's Advisory Board of the Reconstruction Finance Corporation," of which he is a member.

We refer to an article in *Civil Engineering*, Volume 3, on "piles," issue of February, 1933, where John Gregory was co-author with Robert A. Allton '13, and James H. Blodgett '20. The subject was entitled "Holding Down Power of Concrete Piles."

"Piles are commonly thought of as providing a means of supporting loads and offering resistance to settlement. There are times, however, when they offer a satisfactory and economical method of holding down a structure subject to hydrostatic uplift. This article describes the results of field tests, made at Columbus, Ohio, to determine the holding down power of precast, reinforced concrete piles, so that a comparison of cost could be made between two designs for storm stand-by tanks, one with a heavy concrete bottom, and

1895 Continued

the other with a lighter reinforced concrete bottom held down by piles. The tanks are now under construction in that city. As but few experiments are on record regarding the holding-down power of piles, the Columbus tests should prove of interest to engineers who deal with problems of hydrostatic uplift." — LUTHER K. YODER, *Secretary*, Chandler Machine Company, Ayer, Mass. JOHN H. GARDINER, *Assistant Secretary*, Graybar Electric Company, 420 Lexington Avenue, New York, N. Y.

1896

Jim Melliush has been in Boston. He arrived from New York on Friday, February 17, and stayed over the week-end with Frank Hersey in Needham, and spent additional time seeing old friends. A little crowd was summoned hastily for an informal luncheon at the Engineers' Club, and 14 men ate together, including Jim Driscoll, Gurney Callan, Charlie Nevin, Frank Hersey, Bert Thompson, Rockwell, Melliush, Locke, Will Hedge, Charlie Morris, Lucius Tyler, Perl Underhill, Joe Knight, and Harry Gilman. Gene Hultman was supposed to be present, but in some way he confused the Engineers' Club with the University Club, and waited for the party to turn up at the latter place. It was a big disappointment to all concerned that Gene missed out.

Melliush is making his headquarters in New York at the present time, and he gave a very interesting account of conditions around Barranquilla in Colombia, where he has been engaged on sanitary water supply. He expects to go back later on sewage filtration work when the present economic ills of the world are remedied, and when the little tempest between Colombia and Peru over the Amazon port of Letitia blows over. He painted a rather pleasant picture of Barranquilla, and expressed the opinion that the future of Colombia looked very promising.

Joe Driscoll has been making his usual spring trip to Pinehurst, but this year he left his wife in Brookline, and went on alone in order to be able to give his undivided time to golf. According to Damon and Rockwell, Driscoll has been slipping, and came out as a loser in some of the games played last fall, so Joe needs to get back to his old form. The last report was that he had been able to play all but two days when it had rained very hard.

At the annual Alumni Dinner at the Hotel Statler, February 4, '96 was represented by Damon, Jim Driscoll, Rockwell, Locke, and Tucker. — The Secretary saw Bradley Stoughton at the annual meeting of the mining engineers in New York in February, but Bradley could think of nothing special in the way of news. He expects that his new house will be completed sometime during the spring ready for occupancy.

An editorial in the New York *Herald-Tribune* in January referred to the careers of the children of Presidents of the United States, and, of course, in this

article reference was made to our classmate, Abram Garfield. Although he has not followed a political career, he has been active along civic lines. In his home city of Cleveland he had a lot to do with city planning and in 1931 he headed the committee on slums of President Hoover's conference on Home Building and Home Ownership. Last fall, as President of the Cleveland Chapter of the American Institute of Architects, he proposed that the aid of the Reconstruction Finance Corporation be used to start surveys on methods of slum clearance, leading to definite legislative action later.

Arthur Nash, who has made his headquarters at Chapel Hill, N. C., for many years in partnership with T. C. Atwood '97, under the firm name of Atwood and Nash, Architects, has moved to Washington, D. C., where he is continuing in his profession. — Professor Elizabeth F. Fisher is located at Hotel Everglades, Miami, Fla. She has had the recent misfortune to be very ill in the hospital with a broken hip in a cast. Coupled with this was a low red blood count and embolism of the lungs. However, she has improved to the stage where she is able to move around her room on crutches and is looking forward to more rapid convalescence.

Harry Rawson says that his architectural business out in Des Moines, Iowa, has nothing of a new nature, but there are several jobs which will not be completed before January, 1934, and his optimistic nature makes him feel that by that time there will be something else doing.

Welles Partridge has finally traversed the continent and arrived in Hollywood, Calif. The Secretary is in receipt of a little eight-page pamphlet entitled "Father Partridge — A Short Sketch of His Life" published by the Rev. Neal Dodd, Rector of the Church of St. Mary of the Angels, Hollywood's "Little Church Around the Corner." It is stated that this pamphlet is sold in any quantity for ten cents a copy in order to help Father Partridge in his work. It gives the story of various episodes of his life. Apparently he got across the country, although even Partridge himself does not seem quite sure how he did it. He sleeps in his car and does his own cooking and laundry work. He trusts entirely to voluntary offerings to carry him through and to help on his missionary work. His dog, Spot, which went across the country with him, is still with him in his automobile. Apparently his plans are to spend several months in missionary work in the vicinity of Los Angeles.

It is with great regret that the Secretary announces the death of Ed Pingree, which occurred in Providence, R. I., on February 1, 1933. At an early age he left his home in Lawrence, Mass., and learned the monumental stone business, and was for a while in business for himself in one of the Vermont cities manufacturing monuments. Later he returned to his home in Lawrence and in 1892 entered the employment of the Inspection Department of the Associated Factory

Mutual Fire Insurance Companies at 31 Milk Street, Boston. On account of his skill as a draftsman and his aptness in mathematics and engineering, the late John R. Freeman '76 induced him to take a course at M. I. T. and he entered in 1893, doing the course in three years.

After that he was personal assistant to Mr. Freeman on work in connection with the Metropolitan Water Supply of Boston, and also in a preliminary survey Mr. Freeman made when he became consulting engineer to the City of New York in connection with their increased water supply, which finally culminated in the great works popularly known as Ashokan Reservoir.

There were intervals during that period when he did a good deal of work on fire protection engineering in the Manufacturers Mutual Fire Insurance Company Group, of which Mr. Freeman was President. Those connections culminated in his appointment as Vice-President of these companies in June, 1907. He was always an intense worker and took very few holidays.

He became quite ill in the winter of 1920-1921 and was confined to his house for several months. He made a marvelous recovery but had a relapse in 1924. Again he overcame his many difficulties and was back at his desk until July, 1932, when he resigned. Since that time he failed quite rapidly.

The foregoing is contributed by B. G. Buttolph '88, who is Vice-President of the Manufacturers Mutual Fire Insurance Company, and who states that Pingree's passing has left a gap in their ranks, and he will be missed for many a day.

We left the Fullers on the island of Mauritius, and there we pick up this last installment of their trip.

"After seeing two cities in ruins from hurricanes, we were congratulating ourselves on having escaped, but on April 10, although the hurricane season was supposed to be over, we at last got caught in the tail end of one at Mauritius, in the Indian Ocean. All the morning downpours of rain and high winds kept everyone watching the barometer, and word came by wireless that a full hurricane was blowing with center 150 miles to the southwest. The Government arranged that two cannons should be fired from the fort if it came nearer. All through the day an air of waiting and suspense prevailed. Not to be caught unprepared, all the storm shutters at the hotel were closed, leaving the inside in dense darkness in the absence of electric lights. The barometer dropped nearly to 28 inches and nothing but hurricanes was talked of. Fierce gusts of wind made the hotel shake and it seemed almost as if the sides would blow in. Limbs were torn from the trees and crashed on the porch, and chairs and anything else movable outside were blown about. Night came, however, without the signal of danger and the barometer showed signs of rising, but everyone was relieved when the weather bureau at last sent the news that the center was turning away from us to the south.

1896 Continued

"After it was over we drove the length of the island to see the damage. The streets of the towns were everywhere littered with branches of trees and in the country native huts were stripped of their thatch, twisted many degrees from the vertical, or blown completely down in places. The cane of the sugarfields, which cover much of the island, was blown over, but fortunately not laid flat. The damage, nevertheless, was great, and endless labor will be required to straighten up the cane and rebury the roots pulled from the ground. We finally got away from Mauritius, Indian Ocean island, on a tramp steamer, two days after the tail-end of the hurricane swept over it.

"Cape Town was reached just four hours too late to catch the boat on which we intended to sail for Buenos Aires. As there would not be another ship for a month, we reluctantly gave up the South American part of our trip and took the first available boat for England, which happened to be a German passenger steamer. We had an ideally smooth trip of 23 days and are now off Brest, France. Tomorrow will find us at Southampton, from which we go to London.

"The famous Derby comes off this week and we shall probably take it in. After that we are going to Ireland for ten days, finally sailing for home about June 13.

"Cape Town, where we waited ten days for our steamer, is one of the most attractive and interesting ports in the world. Immediately in the rear, the vertical-sided but flat-topped Table Mountain rises to a height of 3,400 feet. The summit is reached by an aerial tramway, with tiny suspended cars swinging in the wind from a cable of over half a mile above the ground. The ride is more thrilling than an airplane and the view from the top, commanding mountains and sea, stretches away to the Cape of Good Hope, over 40 miles distant. Wonderful roads lead along rugged granite cliffs, sometimes hundreds of feet above the sea at their base. In the valleys, giant oaks and towering pines lend their charm.

"American cars are everywhere. Gasoline sells for about 35¢ a gallon. The street cars are operated on the zone system, at a charge of a penny (two cents) per zone.

"The Union of South Africa is one of the few British colonies that has retained the gold standard, mainly because of the large gold output from the Johannesburg mines. Strangely enough, however, English silver coins circulate at par, although actually worth 25% less than the local currency.

"The hotels are excellent, with prices half those charged by the same grade in America. The Mt. Nelson, comparable with the best hotels of Florida, charges less than \$5.00 a day, including meals, while at other first-class hotels the price is as low as \$3.00 a day. Fine, five-course dinners with lobster and chicken can be had as low as 60¢, while an ordinary meal averages about 35¢. On the other hand, ices and milk-shakes are expensive, the latter running about 20¢ and the

former even more. A novel innovation is the Cinema Tea Houses, where the price of a lunch is from 20¢ to 35¢ and includes admission to the moving pictures. The meals are served on shelves fixed on the backs of seats. The pictures are silent, American films lasting two hours. Talkies are to be seen in the regular theatres at 50¢ to 75¢, and are quite popular. The pictures while we were there included 'Birth of a Nation,' 'Show Boat,' 'Squaw Man,' and others seen in America several years ago."

This last installment was written on a German passenger steamer just before arriving in England. They arrived home at the beginning of summer according to schedule. — CHARLES E. LOCKE, *Secretary*, Room 8-109, M. I. T., Cambridge, Mass. JOHN A. ROCKWELL, *Assistant Secretary*, 24 Garden Street, Cambridge, Mass.

1898

On January 10 we held a local dinner for '98 at the University Club with 22, including guests, present. Those of our Class were: George Anthony, Elliott Barker, Arthur Blanchard, George Cottle, Robert Draper, Fred Dawes, John Lambert and his son, Roy Peavey, Bill Perley, Arthur Porter, Frank Richardson, Joe Riley, Maurice Thompson, George Treat, Charley Wing, and George Wright.

With our old standbys in this list, it is easy to see that we had one grand time together. We were particularly pleased to have Frank Richardson and John Lambert present. Both are M.D.'s — Richardson with an office at 520 Commonwealth Avenue and Lambert in Lowell. Lambert's son is following his father's profession and is at present at Harvard Medical School.

The real attraction of our meeting was Robert Draper, who told us of his experiences running copper smelters in Russia for the Soviet government. His first assignment was to a smelter down in Armenia; later he was put in charge of a much larger outfit in the Ural Mountains. He is the first one we have heard talk on Russia who made us see the people as real human beings rather than grotesque puppets, and the government as striving with sincerity, though often with poor judgment, to shape events toward better things. He reports that he experienced the utmost honesty and consideration, both from the government officials and from the citizens. With their utter inexperience in machine industries, Draper considered it unavoidable that they should make ludicrous and costly mistakes, but he inclined to believe that the mistakes were temporary setbacks and that the whole trend was one of progress.

We have a reprint from the *Annals of Surgery* of a paper by Harold Wellington Jones, entitled "One Thousand Spinal Anesthetics." Jones is chief of the Surgical Service at Fort Sam Houston, San Antonio, Texas, and the paper is a record of the cases in which spinal anesthesia was used.

In a recent newspaper, Major Lester D. Gardner, Secretary of the Institute of the Aeronautical Sciences, outlined the plan

and purpose of that institute: "Aeronautical research has not been halted by the depression. That is clearly indicated by the desire of 400 scientists to have an institute through which they may present the results of their investigations to the world. . . ."

Charlie Hurter writes from St. Petersburg that since he retired from business in April, 1932, he and his wife took a short trip through England, Paris, and Switzerland, spent part of the summer on Cape Cod, and then went to St. Petersburg to try it out as a permanent residence. For four months in the winter he says it is delightful, but for the year round he can not see it.

Frank Colcord testified before the U. S. Tariff Commission on December 8 in the investigation of demands that have been made for a reduction in the duty on fluorspar. — Roy Peavey is serving on the executive committee of the Watertown Taxpayers Association. Roy and Roger Babson have been working hard to help pull the country out of the depression. We quote a paragraph from Peavey's letter:

"Roger has recently brought out two new books, 'Washington and the Depression' and 'Fighting Business Depressions,' published by Harper and Brothers. . . . I am sending you his little book, 'Cheer Up.'"

"Roger is at present in Florida, where he spends his winters, and is recuperating from his strenuous work of the last month. It seems to us that what is needed is to get everybody out of the habit of fear and hoarding their money and gradually helping trade to open up through advertising and distributing campaigns. In other words, everything is deflated. We are all set to go except everybody is frightened. We think that the worst was passed last summer and that there will be irregular improvement from now on."

The sheaf of Babson Reports and Charts enclosed was all interesting and instructive, but what interested us most was Babson's special letter, which he writes in advance as a New Year's greeting to his subscribers in January, 1935, commenting on the present satisfactory condition of prosperity and sounding a warning as to the dangers of overextension.

We commented recently in these notes on the achievement of Roger Springer of the Boston Transit Commission. We are shocked to learn of his death. We copy the obituary notice from the Boston *Herald* of February 20: "Funeral services for Ernest R. Springer, for the past 12 years chief engineer of the Boston Transit Commission in charge of additions to, and alterations of, the Boston subway system, who died yesterday at his home, 2 March Way, West Roxbury, will be held tomorrow at 2:30 P.M. at Grace Church, Newton. He had been ill six months.

"He was born in Boston, February 24, 1876, a direct descendant of General Warren, attended the Newton schools and M. I. T. and served as a captain of the

1898 Continued

Fifth Massachusetts Regiment during the Spanish-American war, retiring after the war with the rank of major.

"For several years he was engaged in the design of important steel structures and he had charge of the design of the Cambridge subway. During his long connection with the Boston Transit Commission, he had charge of the design of Maverick station of the East Boston tunnel, the Dorchester extension of the rapid transit system, the Kenmore station of the Boylston street subway, and the vehicular tunnel now in process of construction to East Boston.

"Surviving him are his widow, Mrs. Lotta Sargent Springer, a daughter, Mrs. George Guild, a brother, Martin Springer of Cambridge, and four sisters, Mrs. John Jackson of Winchester, Mrs. Harold Church of Cleveland, Mrs. Eleanor Knapp of Boston, and Miss Mildred Springer of Chicago." — ARTHUR A. BLANCHARD, *Secretary*, Room 4-160, M. I. T., Cambridge, Mass.

1900

This Class was well represented at the annual Alumni Dinner, February 4, the following making up a full table: Bowditch, Ike Osgood and son, Charlie Smith, Ziegler, Fitch, Brock, Silverman, and the Secretary.

One more off the list of unknown addresses is the good news from the local secretary at St. Louis stating that Albert P. Stock, VI, is at 309 Olive Street. Nice work, Al, keep in touch with us.

Manley has sent in a change of address and it looks as if Ohio has lost his vote for a while. Bowdon, Cheshire, England, will reach him and we are sending him a notice to prepare for the 1935 Reunion.

There has just been reported to us the death of Burton S. Clark at the Winthrop Community Hospital on February 16. Joining the Class in 1897, Clark was in Course IV.

Those of us who do not duly appreciate the judicial standing of our smiling toastmaster might well have looked in at the public induction into office of Judge Healy of the District Court of Southern Norfolk, held at Stoughton January 29, and listened to the eloquent remarks of the Senior Associate Justice of the District Court, Judge Joseph P. Draper of Canton, and furthermore if you, gentle speeder, pause in your mad flight through Canton and proceed at 25 or so, you will save your classmate the embarrassment of demanding in no uncertain terms that you contribute slightly to the welfare of Norfolk County. Next case.

Wilbur W. Davis was a pallbearer at the funeral of his chief, Ernest R. Springer of the Boston Transit Commission on February 20. Springer was in the Class of 1898 at M. I. T. — C. BURTON COTTING, *Secretary*, 111 Devonshire Street, Boston, Mass.

1901

Well a lot of things have happened since I wrote my last letter and in one respect, at least, the Class of 1901 has made a new high. At the annual Alumni Dinner, in

addition to your Secretary, the feast was graced by the presence of Perk Parrock, Jack Scully, and Bill Dow. Count them — four. Never within the record of man has so large a horde overwhelmed any activity of the Alumni Association as a whole. This would not apply strictly to our showing at earlier five-year reunions, as on several of these occasions many of the faithful, beguiled by the promise of entertainment, have lent their support. And in addition to this rally of the clans, heartening and encouraging as it is, I have yet more news which I hope will please and gratify you in the reading as it does me in the telling.

Immediately after the dinner I started out on a barnstorming trip which centered about the presentation of scientific material to groups in Detroit. Through the agency, however, of the indefatigable Secretary of the Alumni Association, I spent nearly a week in meeting the faithful and exchanging thoughts and, in some cases, more tangible evidences of friendship and good will. In Detroit I saw Louis Williams, once from Duluth but long since resident in Detroit, and Charlie Campbell, the latter doing a splendid work among the blind of the city. Louis was one of the few people whom I saw who was neither audibly nor visibly affected by the depression. The first I ascribe to a natural reticence, coupled with the genial optimism which endeared him to us in college days. The second must be surely traced to that somewhat flamboyant coloring which the lapse of time has done but little to fade. Louis today could serve as a color advertisement for any one of those so-called health foods purveyed to an ever gullible public by the self-appointed protectors of the public weal — for a price. (Cottage cheese at five dollars a pound. Cooked alcohol can't beat this.) Charlie wasn't depressed either but then Charlie has been a professional hold-up man for worthy causes (God knows I can't throw stones about this) for many years and apparently it had not occurred to Mr. Ford to forbid his fellow townsmen to support the Community Chest. Charlie was, as one may say, vicariously affluent, and he radiated well-being for the brief space of his stay.

From Detroit I journeyed on to Chicago and was there lapped in luxury (this has nothing to do with imbibition or deglutition) through the friendly offices of the ever faithful and genial Philip Wyatt Moore. Philip emerged from the fastnesses of his private road, now masquerading under the alias of Fisher's Lane (the liaison here suggested is probably the result of the crime wave) and brought in his wake one Will Ghost Kelley, who for many years, 32 and a bit, to be exact, has emulated the suggestion of a middle name which must have been given by his parents in a spirit of prophecy. As Will came into the Club and we hurriedly bridged the gap of more than three decades, I said audibly, My God, how he has changed. After he had disrobed, however, always with due regard, you understand, to prevailing proprieties,

I realized that my first impression was incorrect and due to a fur hat. When the outer hulls had been pared away the same smiling face appeared which I remember so tenderly in my earlier and less innocent youth.

Another stalwart from the Class of 1901, whom Philip had rounded up for this preliminary canter, was Langdon Pearse who, I understand, is now the leading expert on sewage disposal in the United States. I feel this criticism was unwarranted, although probably meant in kindly spirit, for they all showed healthy appetites and the food looked to be excellent.

DeBerard, whom I have seen once or twice in recent visits to Chicago, was the fourth of our little group. Bill has become an editor, as I think I have previously noted in these columns, and is connected with the *Engineering News-Record*. I myself made the fifth of this assembly of the clans and, to make the measure full to overflowing, Paul Hanson of the Class of '03 joined the party. My last remembrance of Paul was a lovely, if solid, vision in pink tulle, floating through the mazy measures of the baller in the Tech Show. Paul has joined Langdon Pearse in his garbage activities, both professionally and socially. It was a delightful gathering and I can only hope that my hosts on this occasion derived a fraction of the real pleasure that was mine.

It had been planned for me to visit Duluth, but as this meant four hours in an airplane out of a six-hour trip, with a fixture in Minneapolis at the end of it, which I was most anxious to keep, and further, as the temperature was flirting with 30 degrees below and I was journeying around with the blizzard, it seemed well to omit it. The wisdom of the aged was proven in my decision when I reached St. Paul nearly two hours after the plane was supposed to leave.

In Minneapolis good old George Mitchell appeared to greet the wanderer and renew a friendship that goes back to the same memorable three decades and more. When we parted at graduation I wonder how many of us realized that 30 years would slip by without a meeting between many of us. I hold myself peculiarly fortunate that during these years I have had opportunity to foregather with so many of the Class.

My visit to Cleveland on the way home was regrettably of the briefest and it was with other and younger friends that I had opportunity to foregather. Throughout the entire trip, however, I was the pleased and happy recipient of a gracious and charming hospitality, both from old friends newly seen and from new friends newly met.

Next week I am off to New York State on a somewhat similar hegira and there I hope to see others of the Class who are lending their talents to improving that part of the world. A review of the class lists shows an apparent antipathy on the part of '01 for northern New York. Only in Buffalo — God bless it — does one find a really significant group from this particularly favored Class.

1901 Continued

In my next letter I hope to tell you something of plans concerning the Thirty-Second Reunion, for, of course, you all remember that we have one in June. Let me take this opportunity to send my regards and my greetings to the many good friends encountered in the past few days. — ALLAN WINTER ROWE, *Secretary*, 4 Newbury Street, Boston, Mass.

1902

The class delegation at the Alumni Banquet in Boston on the evening of Saturday, February 4, consisted of Bill Bassett, Hunter, Lewis Moore, Burt Philbrick, and Red Proctor. Proctor brought as his guest his son, Robert, a junior at Milton Academy. — Thayer Gates is in Danville, Va., his address being 824 Maine Street. We hope to have particulars of this change from New York in the next Review. — Borden's address is Box 55, Topsfield, Mass. — Burr is in Los Angeles, 800 South Burlington Street.

Milton Dunham writes from San José, Costa Rica, that he has been engaged in farming for the past four years. Dunham went to Costa Rica about 1906 and was for many years superintendent of the Slimes Plant for the Tres Amigos Gold Mine in the Abanagares Field, near Punta Arenas. The ore in this field was worked out a few years ago and Dunham turned to ranching. He calls it "long distance farming" as his ranch of some 1,250 hectares (over 120,000 acres) is situated two-and-a-half hours horseback ride from San José, the capital of Costa Rica, where he lives. The products of his ranch are corn, rice, and cattle, the corn being an introductory crop when the land is first cleared, to get it into shape for cattle grazing. Rice, he says, does well in the years of heavy rainfall.

Dunham extends a cordial invitation to any Technology men who may visit that part of the world to call on him. His ranch is less than 200 miles from Panama, and only a few hours ride from Punta Arenas, which is a port of call for steamers going up the coast from Panama.

Horatio Ward Stebbins, Professor of Mechanical Engineering at Stanford University, died on February 2 at Palo Alto following an operation. He had been ill but a short time and entered the hospital for what was expected to be a slight operation, but his trouble was found to be an intestinal cancer and death came the day following the operation.

Stebbins was born in San Francisco on March 26, 1878, the youngest child of Reverend Horatio Stebbins, for many years the minister of the Unitarian Church in San Francisco and widely known as a leader in civic and educational affairs in that fast-developing state. Reverend Stebbins was one of the founders of the University of California and was consulted often by Senator Stanford in the founding of Stanford University. It is interesting that his son graduated from one of these colleges and taught at the other.

After graduating from the University of California with Phi Beta Kappa rank, Stebbins came east to the Institute and

graduated with '02 from the course in mechanical engineering. After graduating, Stebbins entered the employ of the Southern Pacific Railroad in the Test Department of their shops at Sacramento. After two and a half years Stebbins was transferred to San Francisco and made assistant engineer of tests, with duties covering the Pacific Division of the railroad. In the fall of 1905 he left the Southern Pacific to take a position as engineer for the San Francisco Bridge Company, a firm of general contractors. In this capacity he spent several strenuous years in doing his bit in the rebuilding of San Francisco after the earthquake and fire in the spring of 1906.

In 1914 Stebbins became an instructor in the Department of Mechanical Engineering at Stanford University. He has been located at Stanford ever since, rising through the grades to a full professorship.

Stebbins was married in 1906 to Miss Elsie Thompson, who survives him. They had one daughter, Amelia, born in 1912 and now a junior at Stanford. He was a quiet, home-loving man, and deeply interested in his academic work. He was a loyal Californian, glorying in the wonders of his native state and never leaving it for any long time except for his course at M. I. T. — Besides his wife and daughter, Stebbins is survived by his aged mother, Mrs. Horatio Stebbins and a sister, Miss Lucy Ward Stebbins, Dean of Women and Professor of Social Economics, at the University of California. — FREDERICK H. HUNTER, *Secretary*, Box 11, West Roxbury, Mass. BURTON G. PHILBRICK, *Assistant Secretary*, 246 Stuart Street, Boston, Mass.

1904

The amount of class news for this issue is rather small so I will open with the announcement that the Annual Reunion of the Class is expected to be held on June 23, 24, and 25 at East Bay Lodge, Osterville. The actual details referring to the reunion will be in the hands of the classmates within a short time and I hope that the action of the new administration in Washington will make it possible for a goodly number to attend.

Professor Locke informs us that Guy Riddell is now back in New York City, after having spent considerable time on work in Russia, Poland, and Germany. Subsequent to finishing his work, and accompanied by Mrs. Riddell, he spent two months in Egypt and Italy.

Gus Munster, long connected with the Boston and Maine Railroad as Purchasing Agent, has recently been appointed Vice-President and Director of Purchases of the Boston and Maine and holds a similar position with the same titles in the organization of the Maine Central Railroad. The last time I talked with Gus it was evident that the change in title and added responsibilities had made no change in his sunny disposition.

After a number of years, during which the representation of the Class of 1904 at the Annual Alumni Banquet consisted of the appearance of Hump Haley, the Class

broke into prominence again by a reasonable representation at the dinner held this winter. The record of the Class in this instance was in no manner due to my efforts. Gene Russell called me up one day and said he had seen Howard Moore who asked if the Class was going to appear at the Annual Dinner and stated that he thought it would be a good idea to hold a small pre-dinner reunion at the University Club. I told Gene that if he felt sufficiently interested to endeavor to round up a reasonable crowd, he had my permission to do so and that if he was successful, he could count on me to appear.

When I arrived at the University Club I found Bob Dennie, Charlie Stebbins, Howard Moore, Ed Parker, Dan Comstock, Gene Russell, Hump Haley, and Howard Gould. We spent about an hour there and all enjoyed ourselves very much. The dinner was scheduled to commence at 6.30 o'clock. When we arrived at the Statler at 6.45 we found that we could have stayed at the University Club longer.

At the Statler we found Mert Emerson but when we proceeded to the table allotted to us we found that part of the table had been allotted to '03 so that our unusually large delegation was split up at three different tables. Mert Emerson sat with some older graduates, while Hump Haley and Gene Russell sat with the Class of 1920, and by their dignified manner probably restrained the more youthful members from over-exuberance. After the dinner was over we found another classmate who did not sit with us, Mrs. Stanley McCormick, who sat with the co-ed division. You can see, therefore, that the representation of the Class at the Annual Dinner was quite successful.

In spite of strenuous efforts on my part I have been unable to gather any more items of interest to put into this issue and with perennial hope that something will come to hand before the next issue I will now bring these notes to a close. — HENRY W. STEVENS, *Secretary*, 12 Garrison Street, Chestnut Hill, Mass. AMASA M. HOLCOMBE, *Assistant Secretary*, 3305 18th Street, N. W., Washington, D. C.

1905

From Charlie Starr, I: "I guess no profession has been hit harder than the architectural and the boom days of '29 stand out painfully clear now by comparison in Chicago. But the architects here are not taking it lying down. One of my activities for the past two years was to serve as Secretary of a group of prominent architects here studying architectural practices with a view to frankly analyzing methods and practices commonly followed in the hope of suggesting possible changes for the good of the profession. The group was known as the Joint Committee on Architects Practices, being comprised of members of the Chicago Chapter, American Institute of Architects, and of the Illinois Society of Architects. Over 50 meetings were held and a wide range of subjects studied. Specific recommendations were made on

1905 Continued

such matters as office cost accounting, fees, checking contractors' shop drawings, types of contracts, and so on. The report has occasioned considerable comment and, it is hoped, will prove helpful in meeting the new order of things we must all face.

"Last September I passed the senior architect examination for registration in Illinois. You may recall that my earlier activities were in architectural engineering.

"For the past six months I have been functioning under the handle of Senior Deputy Building Assessor for Cook County. In view of the financial condition of Cook County, as well as the city of Chicago, the title has to serve as the principal part of the stipend, but the work has been very interesting.

"Summary building appraisal opens up problems not ordinarily encountered in building design and construction. In good times, generally speaking, taxes are paid with little objection, but in times like these building valuations must be correct and fair to withstand the kicks. So far the building appraisals recently completed for Cook County (I was more concerned with the Chicago "loop" buildings) have proven very generally acceptable (at least they have not been shown as yet to be unfair or inaccurate), and it will be interesting to see whether they will stand the acid test of the courts where some cases will doubtless be taken."

Harry Charlesworth is now President of the American Institute of Electrical Engineers. His long and honorable record with the telephone companies and the A.I.E.E. will doubtless appear elsewhere in The Review, so we shall note only that at the society meeting in Pittsburgh, the old team of Charlesworth and Chesterman put on a new act, demonstrating by a transatlantic chat with London that the telephone has linked all continents into a "world-wide community."

Grove Marcy writes that the following were at the Alumni Dinner and all had a good time: Boggs, Dissel, Gammons (and his two sons, now at the Institute), Lord, Marcy, McLean, Pirie, Prichard, Stevenson, and Wentworth.

There are eight Smiths on the class cards: Albert H., Chicago; Albert L., Cleveland; Converse, New Haven; Huntington, Cleveland; Edward C., Lakewood, Ohio; Edwin L., Milwaukee; Lowell, Everett, Mass.; Walter, Greenfield, Mass. The Alumni Office thought they had located No. 9, Alfred D., in Chicago but it turned out to be an '04 Smith of similar nomenclature. With him and Sidney, long lost, we would have had ten. With 275 Smiths among the former students, the Alumni Office can hardly be blamed.

Joe Daniels, III, wrote in December: "I was elected Secretary of our Technology Club of Puget Sound, a position I am honored with regularly when everyone else refuses the job and when there is no money in the treasury. We enjoyed visits last summer from Dr. Compton, Dean Lobdell, and Jim Killian.

"I haven't been researching at all lately. Trying to do one's daily task at the University, plus the additional demands of civic responsibilities and general assistance to the mineral industry of the state, takes all the time available for work."

Joseph T. Lambie is Chairman of the *Daily Princetonian*, the student newspaper at Princeton. It seemed somehow to connect with Jim Lambie, II, to whom we wrote. Jim kept mum. But a gravure section of the paper showed Joseph at his desk and now we know. He's the image of his father. — Leigh Thompson has been with the W. H. McElwain Company and its successor, the International Shoe Company, since 1907. For some years he was in the order and production departments of which he became manager in 1923. In 1932, he was made superintendent of the Massabesic factory, making 3,500 pairs of juvenile McKay shoes daily. He has a daughter in high school. — We have a new address for Walter Burns, 117 Union Street, Schenectady, N. Y.

Sid and the Boston crowd decided that class lunches should be resumed so a call went out and the following showed up at the Chamber of Commerce on February 3: Ball, Boggs, Buff, Damon, Donald, Goldthwait, Hawkes, Johnson, Kenway, Marcy, Strickland. More luncheons are to follow.

From Edward C. Smith, V: "Our son, Edward, who will be 20 in April, is a freshman at Oberlin this year. At present his major subject is chemistry, which he enjoys highly under Dr. Holmes.

"I have not indulged in any further historical research. The Town of Middlefield, Mass., is to celebrate its 150th anniversary of incorporation next summer and I have been asked to deliver the historical address. So I shall have the task of boiling the history of a century and a half into half an hour's talk. I have the job only half done."

George Jones, II, has been generally recognized as the '05 figure skating champion. New evidence arrives to show that the crown now rests upon the hairless head of Dick Dickerman, XIII. Before us is a picture of Dick in tights and bushy, caught in the act of Kurlaufen at the Providence Ice Palace. Doing either a counter-rocker-change-bracket or half-gainer-with-full-twist, he exhibits the form of an Irving Brokaw. And on the cover of *Collier's* this week, February 25, are Dick and Fröken Sonja Heine in a graceful exhibition of pair skating. Ice has provided our classmate with a fountain of youth.

Perhaps remembering your Secretary's claims to prowess on ice, Dick asked him to bring his skates and spend the weekend at the rink. This was an enticing invitation, but another look at the picture made it seem wise to decline with untarnished reputation.

Dick admits badminton as well, but not too well, for Elmer Wiggins, V, took him into camp. Boston badminton experts please note. — ROSWELL DAVIS, Secretary, Wes Station, Middletown,

THE TECHNOLOGY REVIEW

CONN. SIDNEY T. STRICKLAND, Assistant Secretary, 20 Newbury Street, Boston, Mass.

1906

Eight members of the Class were present at the Alumni Dinner held at the Hotel Statler, Saturday evening, February 4. They were: W. G. Abbott, VI, Herbert Ball, II, Sherman Chase, XI, Ralph Clarke, VI, T. L. Hinckley, XI, C. L. Kasson, VI, J. W. Kidder, VI, and E. B. Rowe, VIII. This year the dinner was a stag affair and naturally we missed the presence of the ladies. Notwithstanding the absence of the fair sex, a very interesting and enjoyable time was had by all who attended. Several items of news were collected from the classmates present.

All will be interested to know that the Assistant Secretary has a son in his freshman year at M. I. T. Thus, the Class of 1936 will have at least one representative whose father was in a class to graduate 30 years previously. Ned's son is studying naval architecture, is a candidate for the freshman hockey team, and seems to be on his way to become as good a Technology man as our Assistant Secretary.

Abbott advised he has purchased a summer place at West Falmouth, and suggested the possibility of staging a day's outing at said place. This will be given further consideration by the secretaries.

Herbert Ball imparted the information that one daughter graduated from Wellesley last year and is now doing advanced work in mathematics at Duke University. The second daughter is now an undergraduate at Wellesley.

A memorandum from Professor Locke states that Charles F. Willis, III, is President of the recently organized Arizona Chamber of Mines at Phoenix, designed to bring together buyers and sellers of mining property in the state.

The *Business Week* of November 2, 1932, showed a picture of H. D. Church, II, standing beside a new 12-cylinder, 225-horse power, horizontal type automobile engine for use in buses. The motor was designed by Church, who is an engineer with the White Company.

Just after compiling the notes for the February issue, the Secretary received a letter from Harold Coes which read in part as below. As the letter was written the last part of December, "the other day" must mean about Christmas, 1932. "Coming down on the train the other day with Albert Hemphill, and running into Charles Howard on the street, all reminded me that maybe there were some things going on that you ought to know about. Howard, I think, has finished up his work with P. W. Chapman and Company and is seeking 'new worlds to conquer.' I believe the Pullmans have moved to Montclair and I regret that Mrs. Coes and I have not had an opportunity to look them up. The American Society of Mechanical Engineers elected me a Vice-President and imposed some duties in connection with the Finance Committee on me, and that, in connection with the preparation of papers, both for the

1906 Continued

A. S. M. E. and the Taylor Society, kept me busy for a while. A group of engineers spent a very pleasant evening on December 17 as the guests of President Hoover. We had all been active in the Engineers' National Hoover Committee — Doctor Jewett and General Carty were there and I had been National Chairman of the Finance Committee. We had a most enjoyable time on that evening and M. I. T. and '06 were represented." With further reference to this same gentleman, the following is an extract from the Newark Evening News of February 9, 1933: "Election of Harold V. Coes of New York as President for 1933 of United Engineering Trustees, Inc., has been announced. He succeeds Harry A. Kidder. Mr. Coes is manager of the industrial department of Ford, Bacon and Davis, engineers of 39 Broadway. He is a former Vice-President of the American Society of Mechanical Engineers, of which he has been a member since 1907. He is now a manager of the society and a member of its budgeting policy committee. United Engineering Trustees, Inc., is the joint agency of the American Society of Civil Engineers, the American Institute of Mining and Metallurgical Engineers, the American Society of Mechanical Engineers, and the American Institute of Electrical Engineers, known as the four Founder Societies. It owns and administers for these societies, the Engineering Societies Building at 29 West 39th Street, as well as an endowment and other funds and properties. Its departments include the Engineering Foundation, which aids research in engineering and the sciences, and which was endowed by Ambrose Swasey with gifts aggregating \$500,000, and the Engineering Societies Library, the largest strictly engineering library in America. Other activities are carried on through an administrative department." This shows that Harold is bringing more honors to himself and the Class by unselfishly donating his time and energy to the promotion of the work of the Engineering Societies.

The Secretary is looking forward to lunching with Otto Blackwell on February 27, as he is going to give a talk at the Institute on the afternoon of that date. Look for further details in the June issue.

Classmates will be sorry to hear of the death of Burnell Poole. As readers will recall from previous notes in the column, Poole had attained a national reputation as a marine artist, although taking the Electrical Engineering course. After the last reunion at Oyster Harbors, Syd Carr and Herbert Whiting called on Poole and found that he had been ill for some time as a result of a paralytic stroke. The following notes concerning Burnell were evidently clipped from a New York paper and were submitted by Herbert Whiting: "Burnell Poole, 49, well-known artist in etchings and marine paintings, died of a heart attack yesterday in his home in Englewood, N. J. During the World War Mr. Poole was a lieutenant commander in the United States Naval Reserve, and was assigned by his government to the British fleet as an official

artist. After the war he was commissioned by the United States Government to execute 12 oil paintings depicting the activities of the Navy. Eight of these were completed before his death and are now hanging in the United States Naval Academy in Annapolis, Md. A well-known work of the artist is his painting of a picture of the old *Corsair*, the yacht owned by the late J. P. Morgan. This picture now hangs in one of the cabins of the new *Corsair*, which is owned by the present J. P. Morgan. Mr. Poole, who was a son of the late Mr. and Mrs. Frederick E. Poole, of Boston, was born in Worcester, Mass., and after attending Pomfret Preparatory School, in Pomfret, Conn., entered the M. I. T., from which he was graduated as an honor student in 1906. He leaves his widow, Mrs. Constance Poole, and a son, Burnell Poole, Jr., ten." — JAMES W. KIDDER, Secretary, Room 505, 261 Franklin Street, Boston, Mass.; EDWARD B. ROWE, Assistant Secretary, 11 Cushing Road, Wellesley Hills, Mass.

1907

In the January issue of The Review we told something of classmate James Reed. The San Francisco Examiner of January 19 contains the following additional news: "James Reed, former commander in the Construction Corps, U.S.N., was appointed yesterday as general manager of the Golden Gate Bridge. He will take office at once, at a salary of \$12,000 a year, succeeding Alan MacDonald, who resigned three weeks ago. — Only two names were submitted to the board of directors by the policy committee, which considered more than 100 applicants. — Reed is superintendent of the Schlage Lock Company. He is 52, and lives at 1880 Jackson Street. He is a graduate of Annapolis and the M. I. T., and has specialized in management for 25 years."

The Boston News Bureau of January 26 stated that "at the annual meeting of Maine Gas Companies, Alexander Macomber, a director, was elected Treasurer." — An article in the Montana Standard of Butte for December 6 states that Montana Democrats have adopted a new plan for promoting party growth by the formation of a state-wide league which will devote its energies to the dissemination of democratic principles. The executive Secretary of this new league, which is to be known as the Business and Professional Men's Democratic Club, is our energetic Carl Trauerman.

The Boston papers of February 20 told of the death of Mrs. Lucia S. MacGregor, mother of our classmate, Frank MacGregor. She was the widow of Frank P. MacGregor, one-time editor of the Hyde Park (Mass.) Times and died at the Wilmington, Del., home of her son. The sympathy of the Class is extended to Frank.

The following new addresses have been recently ascertained by the Secretary: Lawrence Allen, 42 Plainfield Street, Waban, Mass.; Charles R. Bragdon, Care of Ault and Wiborg Varnish Works,

Inc., 75 Varick Street, New York City; Albert L. Burwell, 953 East 46th Place, Tulsa, Okla.; Lawrence C. Hampton, 901 South Kingsley Drive, Los Angeles, Calif.; Warren I. Keeler, Keeler and Long, Waterbury, Conn.; Harry L. Moody, 420 Memorial Drive, Cambridge, Mass.; James G. Moore, Savona, N. Y.; Joseph D. Whittemore, Loudon Heights, Albany, N. Y. — BRYANT NICHOLS, Secretary, 12 Newland Street, Auburndale, Mass. HAROLD S. WILSON, Assistant Secretary, Commonwealth Shoe and Leather Company, Whitman, Mass.

1908

We have only recently learned of the death several years ago of Charles B. Ambrose at Gossville, N. H.

Ralph J. Batchelder's new address is 392 South Catalina Avenue, Pasadena, Calif. — Frederick W. Lyle is now located at Swissvale, Pa., 1120 Updegraff Street. — Rev. Herbert A. Cassidy, for several years located at Tiltonsville, Ohio, is now located at Alliance, Ohio, R. F. D. #2. John H. Caton's address is 1470 Northwestern Bank Building, Minneapolis, Minn.

Harry S. Chandler, formerly with du Pont at Boston, is now manager of Paint and Varnish Division of Canadian Industries, Ltd., Toronto. His home address is 60 Baby Point Road. James McGowan, who is with Campbell's Soup at Camden, recently sent me a copy of *The Weekly Hazard*, a publication of the Royal York Golf Club, in which there was a very good picture of Chandler.

Henry W. Shalling, formerly representing the Miller Company, Ivanhoe Division, of Cleveland, is now located with the same company at Meriden, Conn. — We have heard through Paul S. Hopkins '10, President of the Shanghai Technology Club, that he sees Tsok Kai Tse almost every day. Tse is director general of Consolidated Tax in the Ministry of Finance. This bureau, as I understand it, supervises internal revenue and consumption of taxes.

Recently heard from Lewis K. Ferry, who is now located in Pittsfield, Mass., inquiring about plans for our Twenty-Fifth Reunion which comes this summer. Ferry has apparently spent a great deal of time in Cuba since 1911. — Burt Cary and his family enjoyed a two weeks' cruise to the West Indies in February.

We are sorry to note in the Chicago Tribune of February 12 the death of George H. Pierce, who had been Valuation Engineer for the Chicago Rapid Transit Co.

George Glover, General Chairman of the Twenty-Fifth Reunion Committee, is receiving favorable replies to his inquiries to the western members of the class as regards the Twenty-Fifth Reunion in June. The plan at present is to have a get-together dinner in Boston, Thursday evening, June 15, and then go down to the Cape on the 16th and return to Boston Sunday afternoon, June 18. We are planning to stay at Oyster Harbors Club, just outside of Osterville. The Club has its own 18-hole Donald Ross golf course,

1908 Continued

with an excellent bathing beach immediately adjoining the Club, as well as tennis courts, riding stables, and so on. The Committee will shortly send more information about the Reunion but in the meantime be sure to make your plans so that you can attend. Please read the following letter from George Glover, and plan to be in Boston the 15th of June: "According to The Technology Review and confirmed by some of the boys from Boston, I have been delegated a committee of one to do what I can to stimulate enthusiasm for our coming Twenty-Fifth Reunion of the great Class of 1908, sometime in June and somewhere on Cape Cod. I have not missed a Reunion myself and I think it is a shame so many of the boys have missed them; it is really a treat, a lot of fun, and something you will never regret. We will never have another Twenty-Fifth Reunion and naturally, we should be very enthusiastic to make it the most successful of all.

"I am one of those traveling salesmen going from 'city to city' (spelt with a 'c') and by personal interview am doing what I can to pep up the Reunion. I need all the help I can get. In order that I may know that I have your correct address and that you are a possible 'Reunionist,' please drop me a line in the enclosed envelope. In my next letter I will list the names of the boys who have definitely assured me they are coming and we will see if we can build this list up between now and June.

"I am leaving it up to the boys in Boston to get the New England crowd lined up. In some of the large towns where a number of 1908 boys are located, I will try to get some one to act as a committee of one to line up that crowd.

"This year the idea is to assemble in Boston on some Thursday early in June, visit Tech, have a preliminary dinner, then go down to the Cape Friday morning, remaining until Sunday. Here's to a Successful Twenty-Fifth Reunion." — HAROLD L. CARTER, *Secretary*, 185 Franklin Street, Boston, Mass.

1909

Perhaps you missed seeing the class news in the March issue of The Review. The reason was NO NEWS. Let's not let it happen again, fellows! Write to your Secretary, even if it is only a few lines. Someone will be interested in reading what you are doing and where you are now located; you may be in an adjoining town to someone else in the class and neither of you are aware of it.

I run across Doc Lovewell quite frequently going to or from the office. He is with the Old Colony Trust Company and says he is busy.

Five of us represented the Class at the Alumni Dinner in Boston on February 4: Brad Dewey, Francis Loud, Chick Shaw, Henry Spencer, and myself. Checking up vital statistics, we find that Francis is still unmarried; Brad has four children, two boys and two girls, ranging from about 17 to eight years of age; Chick has a boy nearly 18; Henry has a

girl 15, followed by three boys, 12, ten, and six years old, respectively, and your secretary has two boys, the older one not quite 18 and the younger 16.

A. B. Henderson (Hendy) tells me he is now Alderman of Ward 5, Beverly, Mass., for the current year.

In the January issue of The Review, reference was made to the Class baby, and the question was asked whether we had a grandfather in the Class. Have had no response to the letter, but Lewis Johnson writes as follows:

"From the last Review, I note that George Haynes lays claim that his daughter is the Class Baby. I really can't let that go unchallenged. At the time that my son Ralph was born there was apparently no dispute and due record was made in The Review at the time. Ralph was born on April 5, 1910, and I was married on June 10, 1909, as was duly witnessed by some of our honorable classmates. I should be glad to learn what George has to offer as evidence of seniority in this interference. (George admits he beat the gun, so to speak, by getting married before graduation. C. R. M.)

"I have been badly tied up the last two years in connection with a patent infringement trial and couldn't even attend Paul's last class luncheon. I haven't seen any of the Class for a long time now, except A. L. Matte, who is with the American Telephone and Telegraph Company at New York. He looks much as ever and is the same quiet gentleman. I had little time to talk with him. I miss Francis Loud now that he has returned to New York, for I did see him occasionally." — CHARLES R. MAIN, *Secretary*, 201 Devonshire Street, Boston, Mass. PAUL M. WISWALL, *Assistant Secretary*, General Foods Corporation, 250 Park Avenue, New York, N. Y. MAURICE R. SCHARFF, *Assistant Secretary*, 1 Wall Street, New York, N. Y.

1910

Dudley Clapp has been ill and was unable to submit notes for this issue.

1911

Somehow I seem to have an intuition that I'm going to meet this Believe-it-or-not Ripley some day and he's going to demand proof positive of my repeated declarations that there were 11 members present at an '11 dinner. However, 11 were present at the Alumni Dinner. Count these names: Bill Coburn, I, Joe French, IV, Cleon Johnson, X, Harry Lord, II, Charlie McManus, I, Roy MacPherson, II, Carl Richmond, I, O. W. Stewart, I, Ted Van Tassel, X, Ed Vose, XI, and Emmons Whitcomb, X.

In accordance with the masculine mandate of Allen Rowe, this year's affair was once again stag, save for a few co-eds and invited lady guests. With this in mind, there was a distinct unanimity of surprise among the '11 group that Fat Merrill was not present.

This was Harry Lord's first appearance at a class function since his far-flung trip more than halfway around the

world. He promised a report of this in time for these notes, but advised me on February 20 that due to the rush in taking over a new job with the President Suspender Company in Shirley, Mass., his letter will have to be delayed, but he promises it in time for the May Review.

Bill West, II, head of the Great Lakes Forge Company, with headquarters in Chicago, has moved his office from the Tribune Tower to 160 East Illinois Street. — As February entered we were indeed sorry to learn that Tommy Haines's wife had a bad fall in their Allston home, resulting in a painful leg injury, but we're glad to have since learned of her fine recovery.

We trust you all enjoyed our self-styled literary digest set of class notes last month, and as a conclusion to these notes we offer digests of an open letter and an article by Don Stevens, II, Vice-President of The Okonite Company, Passaic, N. J., and known to all of us for years as a prophet of common sense, good cheer, never-say-die. Both appeared in the January 21 issue of *Electrical World* and if you want to read them in full just get a copy, say from Dave McGrath, our friend in the Class of 1912, of the McGraw-Hill organization, New York City. They are both fine reading.

Under "Readers' Forum" Don comments on an article entitled "Balancing Technocracy" in which the editors "chose one of my favorite words and one that I like the least. A graduate of M. I. T., I have nevertheless continually opposed technique, technocracy, and teachings that lead to doing things in the technical, difficult way. On the other hand, I consider the word 'balance' to be one of the most powerful and least studied and most commonly used in the language. On two separate occasions I have gone back to M. I. T. and talked on 'Balance'."

Don believes Howard Scott is performing "a wonderful service in that he is scaring everybody and making everybody think." He does not agree with any of his fundamentals, but many of his side issues appeal to him. For instance, Technocracy indicates "that changes are now occurring to counteract the bad state of balance that is existing, but nature never gets in balance and to restore balance we can't let nature do it all."

As his letter unfolds, Don seems to feel that (1) we must work out our internal adjustments first; (2) despite the value of becoming self-sustaining, economic areas which might war upon each other do not seem the solution; (3) sweeping reforms are unwise, yet dense industrial areas should be worked away from; (4) less control and more sense of balance is wise; and (5) we should move heaven and earth to establish a better balance at home and not whine about an export trade that, at the most, never amounted to more than 10% of our total national business volume.

In conclusion Don says: "We mustn't stress too much the advantages of the small plant from a financial standpoint. . . . I am firm in my allegiance to the small plant because it is a happy place

1911 Continued

and a sensible place in which to work. But if you advocate too loudly the disintegration of all large plants into small plants dotted all over the country, and if those large plants believe you, and they seem willing to swallow most anything these days, there will result the usual wild American scramble to try the new program and plants will be set up all over the country and they will fall into decay here, there, and everywhere just as all the little rubber tire factories did. I know, because I was in the tire business when that happened. . . . Movements are going on which, regardless of all our fears, will ultimately correct the present bad state of balance."

"David and Goliath in Manufacture" is the title of the article by Don Stevens in the same issue of *Electrical World*, it being an abstract of an address presented recently at a joint meeting of the Taylor Society, Society of Industrial Engineers, and Marketing Society in New York City. The sub-titles indicate the trend of the article: Taking stock of the small manufacturing plant; Meeting changed conditions; Size in relation to production, sales, and labor; Management the key.

Granting at once that "we have to have our large industries and our government, as both accomplish what no small plant can be expected to," Don maintains that "the smaller plants contain the probabilities for the greatest net happiness and consequent net efficiency." He warns, however, that "if the small plant borrows the ideas of every convention and borrows the program of big industry and establishes bureaus, it will be in trouble."

"The greatest asset of a small plant," he continues, "is its ability to give quick action." It possesses "a wonderful opportunity to handle its labor policies smoothly and without misunderstanding" and "can be alert to have the best of machinery equipment and the best research equipment and staff." Unequivocally Don points out: "I would be the last one to let the impression get abroad that great concerns should be abolished in favor of small concerns. I am simply preaching that great industry has much more to learn from small industry than small industry has to learn from great industry."

In conclusion, Don says: "The trend for quality is returning. We will have to learn that net profits and not gross sales are an indicator of stability. Lower volume must yield a profit. We have our great opportunity to be honest and fair and reasonable with labor. We must become our own economists, watch our own surplus, and remember, after all, that horse sense is only stable thinking."

Well, mates, two more issues (May and July) remain in the current volume of *The Review*. The class notes which you read therein, their content and breeziness, are up to you, and you, and you. Together we have produced many a column of news. Write to Dennie! — ORVILLE B. DENISON, *Secretary*, Douglas Hill Inn, Douglas Hill, Maine. JOHN A. HERLIHY, *Assistant Secretary*, 588 Riverside Avenue, Medford, Mass.

1912

Through the courtesy of Lester M. White, X, we have received an interesting clipping taken from the *Buffalo Courier-Express*. "Men You Ought to Know" is the title of what is evidently a feature department of this newspaper, and the subject of the clipping in question is Harold D. Mitchell, X, who has been located in Buffalo since 1924.

The Buffalo paper shows a good picture of Mitchell, and devotes a full column to a brief review of his career together with a personal interview on his pet hobby, ornithology. He has devoted years to a study of birds, has conducted courses on this subject at the local museum, broadcasts talks on the radio, and is a member of the American Ornithological Union. Coming down to the more practical matters of life, Mitchell, according to this clipping, is chief sales engineer for Potter and Dugan, Inc., distributors of transmission equipment. He joined this firm in 1929. From 1924 to 1929 he was an executive with the Sumet Corporation, in Buffalo, and, prior to that time, he had filled various positions with the Kenyon Rubber Company in Brooklyn, and several other tire and rubber companies. During the war he was with Dr. David Spence on the National Research Council working on the development of gas masks. He has patented several designs for tire treads. Mitchell married a Racine, Wis., girl, Mildred Dickson. They have three daughters, ages 12, nine, and four. Their home is at 46 Jewett Parkway, Buffalo, N. Y.

It is a pleasure to report a visit with C. B. Vaughan, II, and David Dasso, II. We have told you in a past issue of Vaughan's experiences in South America.

Dasso has been located in Peru ever since 1912, until in the fall of last year he came to New York to be the general representative in the United States, of Sulzer Brothers, of Winterthur, Switzerland, manufacturers of Diesel engines, steam and hydraulic machinery, and refrigerating plant equipment. His office is at 50 Church Street, New York City. Dasso's job is making contacts with American industrial organizations, with a view to negotiating contracts for licensing them to manufacture and sell equipment under the Sulzer Brothers' patents and designs. He is also selling Sulzer equipment to American concerns operating in foreign countries. At the time of our interview, he was preparing to leave for a trip to his Company's headquarters in Switzerland for discussion of new projects and sales plans. Dasso has had some extremely interesting experiences in the years he has spent in Peru. He and Vaughan were associated in various activities there for several years. Dasso's views on South American wars, and on social and economic conditions there are highly interesting. We hope to be able to have him with us the next time we manage to get any group of 1912 men together. Dasso is married and resides with his wife and only son, at 1215 Fifth Avenue, New York City.

R. J. Wiseman, VI, tells us that he is about to leave on another trip to the West Coast for his concern, The Okonite Company, of Passaic, N. J. This will be about his seventh transcontinental jaunt. We hope he'll meet some of our Western classmates and bring back a few scraps of news for this column.

C. L. Gabriel writes that he has for some time been one of the Vice-Presidents of the Commercial Solvents Corporation, for the past eight years located at 230 Park Avenue, New York City. Gabriel has been with this company since 1920 and is considered one of their old-timers.

At the Alumni Dinner held this year at the Hotel Statler, only three 1912 men appeared: J. E. Crowley, VI, C. V. Reynolds, XI, and your Secretary.

It is with deep regret that we announce the death of Thomas C. Bond, VI, from acute appendicitis, at the Peter Bent Brigham Hospital, last summer. Bond has been a lighting engineer with the C. H. Tenney Company and had lived in Reading for the past several years. — FREDERICK J. SHEPARD, JR., *Secretary*, 125 Walnut Street, Watertown, Mass. DAVID J. MCGRATH, *Assistant Secretary*, McGraw-Hill Publishing Company, Inc., 330 West 42nd St., New York, N. Y.

1913

The class attendance at the Alumni Dinner was rather disappointing. Only six members were seen: Terry, MacKinnon, Sweet, Braude, Brewster, and Townsend. Those who failed to attend missed one of the outstanding gatherings in recent Alumni history. Being stag and informal, the affair made a very decided hit with those present, and the dinner and speaking were excellent. From the pre-dinner gathering to the singing of the Stein Song, the whole affair was most delightful. Let us hope that more class members will be in attendance next year. Terry, Sweet, and Braude were newcomers to the annual gathering.

Terry is still with Spaulding-Moss Company, as Vice-President, helping A. H. Spaulding to run the business. — Sweet is with the Associated Factory Mutual Fire Insurance Company as fire protection engineer. — Braude is now interested in the hardware firm of Chandler and Farquhar and is actively concerned with the management. — Brewster is still with the Plymouth Cordage Company, while MacKinnon and Townsend are at the Institute.

Jim Russell dropped in the other day, looking hale and hearty in spite of business conditions. He is still on the School Committee in Milton. — W. L. Whitehead, sometime lecturer in Geology at the Institute, has recently been in Nevada City and the Grass Valley district of California, examining gold mines. — Schilowsky, sometime member of the Class, returned to the United States in December. He has been with the Wheeler Organization in Russia. — GEORGE P. CAPEN, *Secretary*, 50 Beaumont Street, Canton, Mass. ARTHUR L. TOWNSEND, *Assistant Secretary*, Room 3-435, M. I. T., Cambridge, Mass.

1914

Those members of the Alumni Association who had the good fortune to attend the Annual Dinner in Boston on February 4 have plenty of reason to know that the Class of 1914 is still in existence. It is with considerable pride that we point out that there were more '14 men attending this dinner than representatives of any other class. If the other classes, including the more recent graduates who are supposed still to be fired by Alma Mater spirit, found it difficult to gather sufficient enthusiasm for the usual class cheering, again we may say that there was sufficient spirit in the Class of '14 to produce more than its share of the noise.

We felt that "a dollar saved is a dollar earned," and, instead of having our regular annual jamboree, we decided to consolidate this event with the alumni dinner. We met, therefore, at four o'clock in the afternoon preceding the dinner and spent a couple of hours in good fellowship. We had with us our regular honorary member, William Jackson; our associate members, Registrar McKinnon '13, Morrison '15, and Zimmerman of the instructing staff; and introduced, initiated, and welcomed as a new associate member H. A. Fiske, Class Secretary of '91. Our meeting was also graced by various officials of the Alumni Association and of the Institute's faculty. It gave us great pleasure to welcome them and we hope that they will be with us in future years when we plan to hold similar meetings.

We did pause long enough to vote that, in spite of hard times, we would endeavor to have some form of a reunion next year to celebrate the Twentieth Anniversary of our graduation. We also voted that, as customary in the past, we would have this a strictly stag affair.

In addition to our honorary guests, the following '14 men were present: Ambler, Berry, Crocker, Fales, Gazarian, Hamilton, Hull, Mason, H. S. Wilkins, Corney, MacKenzie, Morrison, Clissham, Stubbs, Favorite, Atwood, A. V. Swift, H. D. Swift, and Richmond.

If all members of the class replied as promptly to your Secretary's letters whenever he notes a change in address as does Deac Barns, the work of the Class Secretary would be very much easier. Deac has pulled up stakes from New York and is now located in Berkeley, Calif. He writes that for the past 14 years he has been trying to get back out there. He has taken with him his representation in the greenhouse business of Lord and Burnham Company. He is also trying to manufacture a line of greenhouses of his own. From what Deac has to say about the beautiful California climate your Secretary cannot understand why anyone should use greenhouses in California. Nevertheless, all good luck is wished to him.

Deac writes that Bob Moorhouse, his wife, and two sons are planning to visit him in California soon. He does not say whether it is a permanent move or just a visit, but he does go on to say that

he suggests all other '14 men having difficulty in the East come out and settle together on the Pacific Coast, where at least there is no snow to shovel. It will be recalled that Dean Fales was suggesting a '14 village in Maine, where only the barter system need be used. Your Secretary thinks the Pacific Coast proposition looks a little more rosy, particularly having just spent a whole Sunday digging out from under a snowstorm trying to get from the house to the street. — HAROLD B. RICHMOND, *Secretary*, 30 Swan Road, Winchester, Mass. GEORGE K. PERLEY, *Assistant Secretary*, 21 Vista Way, Port Washington, L. I., N. Y.

1915

Spring is here! As bloom the flowers in the spring, so blossom forth the letters. And this Class Secretary's life becomes once more at ease. You see what happened last month; no letters, no column. Please don't let it happen again. To my rescue comes Mary Plummer Rice, V, well and fondly remembered by everyone, with a delightful letter. What a charming family she has and what an envious life to be living the next few years with her children at Lausanne. The size and attainments of her children are, indeed, a boast and a challenge. Do write us, Mrs. Rice, while you are in Europe.

"It seems more than time that my son's birth should be announced, now that he is six months old and has a tooth. Deane Courtney Rice was born on July 3 and looked well on his way to being a prize fighter, as he weighed nine and a half pounds. I long for one of the children to be musical like their paternal grandparents, but the doctor says the baby looks more like a piano-mover than a pianist.

"I have been tempted to write several times in the past year in answer to different challenges: first, for size of family, but I have only four children as against someone's five; second, Mr. Heath's challenge that his child will be ready next year for Tech at the age of 17 — my daughter, Muriel, will be in college at the same time at 16 years, but will she ever be ready for Tech! Not at the rate algebra is dragging. She loves Latin, speaks French far better than English, and Italian very well. I hoped they would all want to go to Tech, but they (the three eldest, 15, 14, and 12) are planning to enter the University of Lausanne. They will spend this, their seventh, summer in Europe at Avignon, and next year we plan to move to Lausanne for a few years. Isn't it remarkable to have children who want to do the things I love to do?"

In New York recently I talked with Sam Willis, III, who is now doing independent market research and consulting work. Sam is active in the local White Plains Boy Scout work and through his interest in boys has become a resident Honorary Secretary of the Alumni Association.

Good Jerry Coldwell, VI, helps out with his usually interesting style, shorn of all profanity this time, with a letter from the cold, bleak stretches of Sault

Ste. Marie and, for your aggravation, on the Canadian side. "When we had lunch together a month or so ago I meant to give you a new address but it slipped my mind. My new address is 35-33 Seventy-Sixth Street, Jackson Heights, N. Y. No move is involved; the city of New York renumbered that section and they are commencing to make nasty comments about the continued use of the old number.

"It hasn't been as cold up here as I expected, varying from zero to 10°. In fact, it is warmer than I ever remember it up in this part of the country at this time of the year. There isn't very much snow either, plenty for sleighing, and so on, but I doubt if there is an average of more than a foot and a half. This is not what you would call a wildly exciting town but the hotel is warm and that is a great help! The food is only fair as they are inclined to run to grease, although not so much as in the Province of Quebec. In that province, outside of the larger cities, they float your food to you on greased skids!

"I've seen a couple of hockey games but they were only fair. The town is in a bad way financially (the people, I mean); hence, they are unable to support a good team. However, the games were better than the movies, as the latter are old and the projection apparatus is poor."

Jack Dalton gives us a laugh and me a prod with this amusing description of the distinguished '15 men at the Alumni Dinner. In not attending, I was not neglecting my duties, but frankly, I gave up those dinners some years ago after a savant from the Gobi desert lulled me into a shameful sleep with a long, tiresome talk on the Boulder Dam project. Jack's letter, however, has had its full effect and we are having a New England Class Dinner in February which will be later reported. "We missed you at the Alumni Dinner last night. Although our numbers were small, several of the old guard were there in all their glory and a good time was had by all. At the '15 table were: Evers Burtner, Laurence Geer, John O'Brien, George Rooney, Henry Sheils, H. D. Swift, and myself, of the class, and E. W. Roemer, Kendall Way, J. T. Loftus, and H. F. Fellows, guests. Arch Morrison was seen but came after the '15 table was full, so joined '14 at a neighboring table. Chet Runnels is apparently on a diet because he didn't show up until after the speaking commenced and with becoming modesty stayed on the outskirts of the crowd, joining us just as the party broke up.

"The success of '14 because of a pre-dinner reunion made us feel that a similar occasion before the next Alumni Banquet would swell the ranks at the dinner to more respectable proportions. Henry (Shadow) Shiels, George (What-a-Man) Rooney, and Johnny (Himself-in-Person) O'Brien thought a class reunion within the next month or two would be a good thing, providing we went to Walker Memorial or some other suitable place where we wouldn't have to pay off a 1929 mortgage to get a light lunch. — It was

1915 Continued

voted (by those old enough to vote) to refer the matter to you with recommendations."

John (Himself-in-Person) O'Brien, of courses I, II, VI, IX, X, and higher numbers, is in the Internal Revenue Service in Boston. Take another guess. He's in the Income Tax Division. John and I spent an afternoon together recently, finally staggering out of Schrafft's after having had a couple of sodas.

It is with regret that I report the death of our classmate, Douglas W. Neff, I, at University, Va., on May 23, 1932. We have sent the sympathies of the Class to his family, who unfortunately have not furnished us any further details. — AZEL W. MACK, *Secretary*, 379 Marlboro Street, Boston, Mass.

1916

Our Class had the best attendance at the Annual Alumni Banquet of February 4, 1933, that we have ever had. The following were present: Steve Berke, Harold Fuller, Barnett Gordon, Earle Edwards, Mark Aronson, Melville Rood, Frank Chandler, Tom Berrigan, Howard Clausen, Murray Horwood, Rusty White.

Rusty White has just returned from Chicago and plans to make Boston his permanent residence from now on. While out West he married a resident of Chicago and he and his wife are making their home at 66 West Cedar Street. Rusty is now engaged in professional work on management engineering with particular reference to remote control of automatic accounting work. This line of endeavor is a result of his work on Central Records. On his way East he stopped at Elyria, Ohio, and had a very pleasant visit with George Kittredge, who is living there and works with the Walsh Construction Company. Rusty also reports visiting Irving McDaniel at the Brooklyn Navy Yard in New York. Mac rates retirement after one more enlistment (what a life). Coming from New York, Rusty also reports seeing Knight Owen who is now at Marthas Vineyard on the temporary retired list. Last Sunday evening, Santy Clausen and his wife entertained Mr. and Mrs. Rusty White, your Secretary, and his wife at their home in Dedham. As a first course, we had freshly opened cotuit oysters on the half shell. Santy had opened these himself and you can well imagine the great delight of all present.

Tom McSweeney is the author of an article in January *Pencil Points* on "What Prospects Lie Ahead." In the editor's note at the beginning of the article it says: "This article is not intended and should not be read as a prophecy. The author has simply examined past and present conditions as shown by statistics in an effort to discover any encouraging signs that may lie hidden behind the dark clouds of depression. He finds a latent demand for housing, but it awaits capital to satisfy it."

Harold Dodge, of Bell Telephone Laboratories, has written a paper on "Statistical Control in Sampling Inspection" with the sub-title, "A new approach to a difficult inspection problem promises real

economies." The paper appeared in the *American Machinist* and was first presented before the American Society for Testing Materials.

Arthur Keller is now Dean of the College of Applied Science and Vice-President of the University of Hawaii in Honolulu. Besides having three engineering degrees he has an LL.B. from the National University. He is a member of the Association of Sugar Technologists and a Major in the Engineers Reserve. The University of Hawaii is the youngest land grant university in the United States. Its student body comprises 1,400 persons, who are drawn from many foreign countries, 21 states, and the Hawaiian Islands.

Joe Barker, as Dean of the School of Engineering of Columbia University, recently broke into two columns of print in the *New York Times*. He advocates a wide research body to seek a true preventive of depressions, such as the present one. Incidentally, Joe has achieved a considerable amount of additional publicity through technocracy's association with some of his instructing staff. — HENRY B. SHEPARD, *Secretary*, 269 Highland Street, West Newton, Mass. CHARLES W. LOOMIS, *Assistant Secretary*, Bemis Bro. Bag Company, Memphis, Tenn.

1917

At Dr. Allan Winter Rowe's Alumni Dinner, we were privileged to have with us, for the first time, Professor W. H. McAdams who has felt previously that his allegiance met a more serious need in some of the weaker adjoining classes. Lieutenant Commander T. F. O'Brien, now of the Charlestown Navy Yard, said that Henderson is teaching at the Naval Academy at Annapolis, a recognition of ability that calls for our congratulations. There were also present Dean H. E. Lobdell and Rudolph Beaver, who is now manufacturing the Beaver knife at Waltham, Mass. This knife is made for surgical purposes and has a removable blade. It will be recalled that Beaver was at one time associated with the Gillette Safety Razor Company at Boston. Hamilton Wood was necessarily present because he was on the committee and had a major part in making the dinner the success it was, and then there were Powers, who peddles highways, Ted Bernard, Rausch, Professor Ferretti, and yours truly.

Leon McGrady sent in his regrets and said that after talking with Phil Cristal in Cleveland, he was almost persuaded to go. He had dinner with Phil and his family in Shaker Heights a few weeks ago and understood that Phil was planning to come to Boston for the occasion. Apparently railroad developments have made it necessary for him to stay near headquarters, for he was not reported as among those present.

Mac writes that in Cincinnati "I saw Skipper Works and we lunched and then I visited his spacious brick house in Glendale. It was late when I arrived but he took me on a tour of inspection which included seven bedrooms, five of which were inhabited by the younger Works, ages 14 down to four, I think. Skipper is

now considering the prep school for his oldest boy where he will be best fitted to withstand the attacks of Bull Breed and the mighty Spofford."

Enos Curtin is in the limelight again with his activities in leading the Crusaders. The *New York Post* on January 14 reported: "The Crusaders, an organization opposed to the prohibition law, will urge Governor Lehman to appoint Enos Curtin, its executive commander of New York State, to the proposed New York State commission to inquire into possible beer licensing and liquor control methods. In this connection it was pointed out that executives of the organization, which has made a special study of the liquor situation in the event of repeal of the Eighteenth Amendment, have been appointed to similar commissions in other States, notably Massachusetts and Ohio. A telegram suggesting Mr. Curtin's appointment and signed by Fred G. Clark, commander-in-chief of the Crusaders, was to be sent to the Governor today. Later Mr. Clark plans to see Mr. Lehman personally in support of the suggested appointment."

"Mr. Curtin, a partner in the Stock Exchange firm of D. M. Collins and Co., has been a commander of the Crusaders since the organization was formed in 1930 and has been executive commander of New York State since 1931. He is a graduate of the M. I. T. and saw service in France during the War, first as a member of an American ambulance unit which went overseas in 1915 and later as a captain in the coast artillery with the A.E.F."

Irving B. Crosby of Boston is the author of a report on the Mineral Resources of Massachusetts recently issued by the Massachusetts Industrial and Development Commission. The rest of his time has been spread over a great number of geological problems in which he is interested, including a serious study of foundations in the greater Boston area. — RAYMOND STEVENS, *Secretary*, 30 Charles River Road, Cambridge, Mass.

1918

Simultaneously from four states came to our desk clippings announcing that a Boston architect, one Royal Barry Wills by name, had won first prize in the small house competition for 1932. Even that undergraduate news organ, *The Tech*, carried the item when President Hoover, honorary chairman of Better Homes in America, presented Bill with a gold medal. "The house submitted by Mr. Wills," the jury said, "shows great charm, expresses the spirit of the locality in which it is built, has a fine scale and composition, and shows a good use of materials. It has an air of domesticity and shows great care in the manner in which all detail has been brought together. There is a good, frank use of chimneys and a fine handling of the entrance terrace. The plan is compact and well arranged. There is a fine relation of rooms, combined with economical and efficient circulation. The library is arranged with real privacy. The service portions are well arranged. The second

1918 Continued

floor hall occupies the minimum amount of space, yet this small house has ample-sized rooms."

"Not many people," remarked the Boston *Herald* in an editorial on February 9, "are now planning the purchase or construction of a large mansion or estate. Probably the times do not justify such substantial investments. But not a few persons who saw the picture of Royal Barry Wills's prize-winning house in yesterday's *Herald* must have calculated quickly whether they could afford to own such an attractive little home."

Interviewed at his home after returning from Washington, Bill expressed concern over his young son's desire for a cat, but displayed characteristic modesty in tooting his own saxophone. All he would say was that Mr. Hoover, in spite of a gracious manner, seemed to be thinking international debts even while his vocal chords were saying things about small houses.

Well, Bill, our heartiest congratulations! Reviewing some of our 1918 estimates of the brethren certainly does prove that you cannot tell how far a toad will jump by counting the spots on his legs.

Harold Weber, one of Bill Ryan's colleagues in chemical engineering, addressed the 264th meeting of the Northeastern Section of the American Chemical Society on "Radio Applied to Chemistry," thus combining with his professional activities an interest in wireless which dates back to his student days. — Carlton Rucker of the Electrical Engineering Department is having fun designing a coordinated telephone-teletype-radio system for the Boston police. Incidentally, Commissioner Hultman of that department is also a Technology graduate.

John T. Norton, former Guggenheim Fellowship holder (who has not yet sent us the promised contribution concerning his European jaunt), is making a name for himself in the field of x-ray examination of metals. Last fall, at the Buffalo meeting of the American Welding Society, he delivered a paper on stresses in welds. — In commenting on the departure of Howard Scott and the Technocrats from Columbia, the New York *Times* quotes Dr. R. A. Wilkins, research director of the Revere Copper and Brass Company in Rome, N. Y., as saying "that unwise application of advanced scientific knowledge is what must be feared in the technological worlds. — Periods of industrial stagnation and economic distress would become fewer and less severe if our industrial and financial leaders would develop the same degree of skill in their fields as the engineer has in his."

As we remember Dick, back in the college days, he was always getting elected Treasurer of everything, including the Class and *Technique*. Oh yes, he did a thesis with Bill Ryan on "Properties of Balloon Fabrics under Repeated Stresses." Maybe he was even then preparing for Howard Scott.

We had hoped to announce in this issue the place, date, and duly elected baby kisser for the impending reunion.

The delay is caused by a commendable Scotchness (both golf and financial) on the part of the committee. At the very moment when these words are being assembled from a Webster's collegiate, the powers that be in Manhattan are gathered together in the New York Harvard Club — yes, of all places, the Harvard Club — to discuss whether it shall be Westerly, Easterly, or two no trumps. — F. ALEXANDER MAGOUN, *Secretary*, Room 4-134, M. I. T., Cambridge, Mass. GRETCHEN PALMER, *Assistant Secretary*, The Thomas School, The Wilson Road, Rowayton, Conn.

1920

The most notable event of the past month is the wedding of Jack Coyle to Miss Nancy Doyle. The Doyle-Coyle nuptials were celebrated at Montclair, N. J., on January 28. The class presents their warmest felicitations to Mr. and Mrs. Coyle.

We were shocked to learn of the death of Charles A. Smyth, which occurred suddenly in Cleveland on January 27.

A. H. Castor has left Manchester, N. H., and is now located in Palmyra, N. J. George Corr may now be reached at 2033 East 81st Street, Cleveland.

We learn from the Chinese Directory that Wen Lu is with the Kiangnan Engineering Works in Shanghai. Yun Sun is with the Kwang Wha Petroleum Company at Shanghai, and Tsen Wei is with the Chinese Government Telephone Administration in Shanghai. Ming Pai is with the Hangchow Electric Works in Hangchow.

Your Secretary has reestablished contact with the Institute and Course XV by taking on a graduate course in industrial advertising, the hours being arranged so as not to interfere with his regular job with Walter B. Snow and Staff, Inc., 1401 Statler Building, Boston. — HAROLD BUGBEE, *Secretary*, 7 Dartmouth Street, Winchester, Mass.

1921

From our Boston correspondent and demon banquet attendee, Chick Kurth, comes the following news of those of the Class he saw at the Alumni Dinner:

"Leo Pelkus was on the job, as usual, and brought two old-timers with him. Leo is now manager of the Commonwealth Electric and Manufacturing Company and lives at 136 Arborway, Jamaica Plain. He reports no family. (Note: Ray reports that Leo has just recently organized the Commonwealth Company as engineers, and manufacturers of "Comm-O-Lectric," electric steam boilers, miniature steam generators, and industrial electric heating. He has issued a splendid catalog of these activities and we wish him success in his new venture — C. A. C.) With Leo was Arnold Rood, who reports he is a patent lawyer with the United Shoe Machinery Corporation. Ace lives at 20 Loverwell Road, Wellesley, the family consisting of wife and daughter. Leo also brought along Ralph Leach, now a chemist with Dewey and

Almy Chemical Company of Cambridge. Bill lives at 12 Flint Road, Watertown, and reports a wife and daughter.

"Sat with E. T. Adams, whose address is 744 Dudley Street, and A. J. Johnson, who probably has not missed an Alumni Dinner since our graduation. Another of those present was E. J. Wilson, superintendent of the Newport Gas Light Company, Newport, R. I., whose home address is 10 Hunter Avenue, Newport. Jeff reports wife, son, and daughter enjoying Newport society life. Harry Rosenfield was on deck and reports he recently saw Park Appel, who is with the New England Tel. & Tel. Also present were Charlie O'Donnell, in charge of house heating for the Consolidated Gas Company of Boston; Ed Noyes, with Sullivan Machinery Company at Scranton, Pa.; Al Peabody, with the Gas Company of Baton Rouge, La.

"Freddie Britton, W. Moy-Ding, and Laurence Burnham, all of 1920, were at our table. Larry reports Josh Crosby still at Hood Rubber Company as chemical engineer on development and research." Chick also reports that on a recent trip to Crawford Notch on the Snow Train he met Doug Burckett, electrical engineer for the Boston and Maine Railroad.

From the New York *Times*, December 31, 1932: "Mr. and Mrs. Lawrence F. Deutzman of Smithtown Branch, Long Island, N. Y., announce the engagement of their daughter, Dorothy, to William H. Leonori, Jr., son of Mr. and Mrs. William H. Leonori of Smithtown Branch and Brooklyn. The date of the wedding has not been announced."

From the Boston *Globe*, January 12, 1933: "Miss Helen J. Curtin, daughter of Mr. and Mrs. Maurice J. Curtin of 55 Grant Street, Taunton, was married to Robert F. Miller, son of Mr. and Mrs. Andrew J. Miller of Rochester, N. Y., at a nuptial mass in St. Mary's Church this morning. Following a reception, Mr. and Mrs. Miller left for Montreal where they will start on a trip around the world. The groom is associated with Stevenson, Jordan and Harrison, industrial engineers, of New York. The bride is a graduate of St. Mary's High School and the Morton Hospital. She has been superintendent of the Mt. Hope Hospital at North Dighton."

Ray writes: "While in Boston, I saw Dick McKay, who is connected with E. A. Pierce and Company, 45 Milk Street, investment bankers. Dick was married on January 2, 1932, to Isabel McCleary of Amsterdam, N. Y., having met his bride-to-be on his return journey from the Philippine Islands, while she was on a trip around the world.

"Unfortunately I missed George Dandrow when he was up through this territory recently. I have a letter from him showing that he is with the Johns-Manville Sales Corporation, 292 Madison Avenue, New York City, as Metropolitan District sales manager of the Power Products Department."

Join in the Share-Your-News movement. Share yours with your secretaries and the rest of the Class. — RAYMOND A.

1921 Continued

ST. LAURENT, Secretary, Rogers Paper Manufacturing Company, South Manchester, Conn. CAROLE A. CLARKE, Assistant Secretary, University Avenue, Chatham, New Jersey.

1923

I'm not even going to attempt to report further on details of reunion plans. Had a conference with Lem Tremaine, General Chairman of the Reunion Committee in Boston, and another with President Bob Shaw and Assistant Secretary Pete Pennypacker in New York the first part of February and the many details yet to be settled were discussed. Except for the fact that the week-end of June 17 is a likely date, as I said last month, and somewhere in Connecticut is the place, possibly Saybrook, any information I might give out at this time would be likely to be misinformation. I am writing these notes in Evansville, Ind., and further information, if any, which may have been forwarded has not caught up to me, so I'll have to let it go at that, as The Review still has a deadline for these notes.

For those who are in or near New York there will be a meeting for 1923 men at the Technology Club on the first Tuesday of each month. This will form a center from which reunion details can be produced.

At the Annual Alumni Dinner in Boston on February 4 the following turned up. There were one or two others but apparently I missed them. C. T. Burke, VI-A, J. C. Flaherty, III, Bernie Proctor, VII, Clarence Chaisson, XIII, Dick Frazier, VI, Egon Kattwinkel, XV, Lem Tremaine, II, Jack Burchard, IV, and J. H. Zimmerman, II, — a very dignified assembly, with no less than two professors and two doctors. Frazier and Zimmerman are professors in the Electrical and Mechanical Engineering Departments of the Institute, respectively, and Dr. Proctor is with the Department of Biology. Kattwinkel, an M.D., is a general practitioner in Newton. The rest of us ordinary engineers accounted for ourselves as follows: Burke, General Radio Company, Cambridge; Flaherty, Construction Engineer, Boston; Burchard, Bemis Industries, Boston; Bond, National Fire Protection Association; Chaisson, C. J. Cox Engineering Company, Boston. Tremaine isn't even an engineer; he's a life insurance consultant.

The impending reunion has stimulated numerous inquiries and made possible some additional light on the activities of various men. Jack Cochrane, X, writes: "I realize that it is high time I made some report of myself in order to have a clear conscience at the tenth year reunion. I spent 1923 and 1924 in the Practice School, followed by 1924 and 1925 in the Research Lab. of Applied Chemistry at M. I. T. The summer of 1925 found me in Cincinnati, recovering solvents for the Formica Insulation Company who manufacture 'laminated Bakelite.' And here it is 1933 and I'm still plugging away with the same con-

cern, trying to keep their research and development work one or two jumps ahead of the other fellow. As far as the outside world is concerned, my only scientific accomplishment is a patent pertaining to our process, but inside, the work is most interesting and, most times, gratifying.

"Having been married since the fall of 1925, I'm getting to the stage of quite mature fatherhood. Just yesterday Jackie, III, brought home his first-grade report card for Pop's first signature, while his kid sister, Joanne, is due for four candles on her cake in March.

"As for news of other '23 men, I can offer but meager bits. Bill Bray is still here in Cincinnati with Procter and Gamble, and has two fine youngsters and a charming wife. Doc Smith surprised me shortly before Christmas by stopping in the office on one of his trips down from Cleveland, whence cometh his electrical devices. I have seen Bud Turner several times here and in Chicago where he is located, having charge of research and development work for the Liquid Carbonic Company. He's an old married man with two kiddies like the rest of us.

"If any of the boys come *bei Cincinnati*, I'll be happy to have them say hello, so I can give them a key to the City Hall."

Howard Keppel, II, writes: "Although I have been with Research Corporation, New York City, for the last four years, I was building houses for a period prior to that time and I have been trying to trade my way out of real estate ever since.

"The recent change of address is my last move, I hope, as I have endeavored to pool the loose ends of real estate into a residence which I hope shall be my permanent home.

"In a recent issue of The Review, some one identified me with Research Corporation and made some inquiry as to what I might be researching. The main business of Research Corporation is the design and installation of Cottrell precipitation equipment for industrial gas cleaning — more precisely, the removal of suspended particles from industrial gases by electrostatic means. A further function of the Corporation is the development and commercial exploitation of such processes and mechanical devices as fall within the scope of its activities."

Captain Walter E. Richards, IX-B, says his recent change of station is merely one of the usual changes followed in the army in ordinary course. He is Chief Engineering Officer of the Air Corps at Nichols Field, Rizal, P. I.

Bob Colburn, IV, announces the birth of a daughter, Joanne, on December 24. He is at present in the Engineering Department of the Forstmann Woolen Company in Passaic, N. J.

I have a card from A. F. Flournoy, II, announcing his services as a patent attorney. He is affiliated with The Research Service of Washington, D. C., and for five years has been an examiner in the U. S. Patent Office.

Dan Sayre, XVI, Assistant Professor of Aeronautical Engineering at the Institute, gave a talk on "Weather and Blind Flying" at the November 22 meeting of the Boston Society of Civil Engineers.

The more important and unexplained address changes coming to my attention recently are the following: Arthur Edwards, II, from Buffalo, N. Y., to Marblehead, Mass.; David B. Joy, XIV, from Lakewood, Ohio, to Fostoria, Ohio; Henri P. Junod, IX-B, from Cleveland to Chicago; Philip Richardson from Copenhagen, Denmark, to New York City; Charles H. Robinson, XV, from Toledo, Ohio, to Hudson, Mass.; and O. N. Stewart, XV, from Cleveland, Ohio, to Gary, Ind. — HORATIO L. BOND, Secretary, 195 Elm St., Braintree, Mass. JAMES A. PENNYPACKER, Assistant Secretary, Room 661, 11 Broadway, New York, N. Y.

1924

The following letter is Bill Robinson's annual letter to the Class, a letter, now that this is its third appearance, which has become a custom. If Bill hasn't suspected it, I have definitely and permanently committed him to this practice, and if you don't believe I would make other commitments, I would welcome an opportunity by receiving other letters.

"This is written on the inspiration of a great event; namely, the high dive act into the sea of matrimony by none other than the original Archangel Carothers. Time: 9:00 a.m., January 12; the place: Beverly Hills, Calif.; the girl: Ruth Schreyvogel, of Brooklyn, N. Y. Archie's brother, Jim, and yours truly attended him, and our wives, the young lady, who is known, incidentally, to Earle Bates, Bill Delehanty, Henry Zeiger, Harold Kurgman, and others. Arch is associated with M. A. Newmark Company, Los Angeles' leading wholesale grocers.

"Rock Hereford is here with the Security First National Bank organization. He has a good job and is otherwise happy. — Fran Jenkins, who really should be classed with '24, represents Kimberly Clark Paper Company, of Wisconsin, on the Pacific Coast. One of his several products is rotogravure print for newspapers. He is the proud father of two fine children.

"You will remember Sam Graham who won the prize for traveling the greatest distance to our five-year reunion at Marblehead in 1929. Sam is consulting engineer for the City of Sierra Madre, a foothill suburban community. — Phil Herick, if my memory serves me, sells pharmaceutical products, including baby food. — Here is good news which bears repeating if you've heard it before. A pleasant surprise was a letter from Harry Cuthbertson telling that reel No. 2 of the 1924 movies has been found. Bill Correale will obtain it and produce the reel at the ten-year reunion in 1934. Not so far away, is it? The showing of this movie of 1924 personal glimpses will be one possible improvement over that eminently successful time at the Corinthian Yacht Club.

1924 Continued

"There is quite a gang of M. I. T. fellows roundabout who foregather on occasions, such as the visit of Lobbie last summer. In a group of 50, 1924 is well represented. — My own little niche is looking after General Electric's interest here in street light luminaires, floodlights, traffic signals, electric fountains, series transformers, cable, and so on. Several of the products are manufactured in our Los Angeles plant, particularly the ornamental street lights, which are used very extensively in Southern California. Traffic signals are capably designed at Lynn by classmate Ralph Reid. This particular nut means cracking a 10-year old political monopoly, which is very interesting. I have recommended that L. A. politicians be sent east to Chicago, New York, and Boston to show the 'pols' there how it is really done.

"Repolitics, Earle Bates last fall charged me to keep California safe for the Republicans. My failure is matched by Earle's efforts in the Empire State. The moral of this is to confine our activities to our own ball yard (we picked five out of five for the important supervisors jobs in L. A. County). Maybe Hal will call this an official message or something. If so, I urge you, each one, right now (sounds like a radio announcer) to contribute something to the '24 column in The Review. Hal's job is tough at best and we must support him as we would like to be supported ourselves. Then the next time we turn eagerly to the '24 notes we will not be disappointed. — I take this means of wishing each one heaps of happiness and success."

Not only am I indebted to Bill Robinson this month but equally so to John Holden. Please note the very satisfactory notes which he sends in for his course. You may not agree that all the members spoken of are from Course XV but if John collects the notes, I'll give him the credit and will even, if he wants, let him claim members for Course XV. Respecting Al Liff, a newspaper clipping permits me to amplify John's remarks. Al has been with Sears Roebuck since 1929, having previously been with R. H. Macy and Company and the Bloomingdale Company, both of New York. His present territory covers 12 stores in three New England states (Massachusetts, New Hampshire, and Maine). His headquarters are at Boston.

For doing the necessary research work, thanks are again due John Holden for the list of the class who are not at the Institute. Our class is well represented on the staff. According to the latest census for the 1932-1933 year, the following are acting as teachers or are engaged in research work: Avery Ashdown, Ph.D., V, instructor in organic chemistry; Philip Bates, Ph.D., VII, 1929, formerly with Frigidaire Corporation in Dayton, research associate in the Department of Biology; Elmer Brugmann, S.M., X-A, assistant professor of chemical engineering; Martin J. Buerger, M.S., III, and Ph.D. (1929), XII, assistant professor of geology; William Cash, M.Arch., IV, assistant professor of architecture; Mur-

ray Gardner, S.M., VI, assistant professor of electrical engineering; Jason Balbaugh, M.S., VI, assistant professor of electric power production and distribution; Harold Hazen, D.S., assistant professor of electrical engineering; Otto C. Koppen, IX-B, associate professor of aeronautical engineering; Herbert C. Moore, II, instructor in mechanical engineering; Avery Morton, Ph.D. in Chemistry, assistant professor of organic chemistry; Thomas Sherwood, D.Sc., X, 1929, assistant professor of chemical engineering; Victor Smith, D.Sc., X, research associate in the Research Laboratory of Applied Chemistry; George Swift, M.S., XIV, 1928, technical assistant in the Department of Physics; Bertram Warren, D.Sc., VIII, 1929, assistant professor of physics.

The annual New York City dance of 1923, 1924, and 1925 was held February 4 and indirectly, through Bill Correale, I heard that it was a decided success this year. The party is always a pleasant one, but I have called it a "decided success" because the crowd was the largest that has been present at any of them.

Weddings this month are two. The first, that of Elise Johanna Rohde, a German girl, who was married on January 16 to Te-Chih Wang. They are now living in New York, although they are soon to sail for China. The other wedding is, after I have read the clipping a little more carefully, only prospective. The engagement of Miss Eleanor Brice Kimball to William H. Van Dusen has been announced in Larchmont, N. Y. Bill is with R. G. Dun and Company. The wedding day is not known.

A member of the class who is taking an active part in public affairs is Julian Overworth, now Secretary-Treasurer of the Kentucky Board of Examiners and Registration of Architects. Recently he contributed a very carefully prepared article in the U. S. *Daily* respecting "Home Building as an Economic Remedy." He believes that one solution of our economic situation is to encourage the building of private homes by revising taxing systems and building costs so as to make such construction an attainable possibility for the individual. I am particularly impressed by one sentence of his: "For what other purpose did our forefathers seek out America as the land of promise — Why else, indeed, do we struggle to advance — if not to find a more ideal, a freer, sweeter home life? Truly that is the ultimate human attainment!" — HAROLD G. DONOVAN, *General Secretary*, 372 West Preston Street, Hartford, Conn.

COURSE XV

In these parlous times it is indeed heartening to be assured of the continued remunerative activity of the members of this class. Surely if any of you were members of that present-day aristocracy of brains, the rapidly growing leisure class, it is reasonable to suppose that your idle hands would be penning cheerful little notes to your Secretary, telling him what color you painted the kitchen and what fun it was putting new rings in the flivver. Instead, the silence of the tomb,

and only one conclusion: that you are all well, happy, and busy amassing that which, in these days of both feet on the ground (and no soles between), passeth for a fortune.

The Annual Alumni Dinner, held the evening of February 4 at the Statler, was decidedly successful, and it is to be hoped that those of you whose habits no longer include the very pleasant one of attendance at this function will reform within the year. Our class was represented in quality, at least, with Ken Billings, Phil Bates, George Thomas, Duke Lindsay, George Glennie, and John Holden at the '24 table.

Phil Bates, who was in attendance at the Institute for some time after graduation, obtaining his Ph.D. degree in 1929, has been for the last four years with the Frigidaire Corporation in Dayton, Ohio, in charge of their food and bacteriological research in the refrigeration field, this work including study of the reaction of bacteria to temperature and the testing of new products and new applications of refrigeration in order to determine their efficiency in the preservation of food. Phil left Dayton last summer and is now back with Dr. Prescott engaged in the study of an industrial food preservation problem in the Department of Biology. Phil is living at 14 Frost Road, Belmont, and claims to be pleased that his activities have placed him once more in Boston. Why not?

Wes Earle appears on our horizon occasionally, being with the Boston and Maine Transportation Company with headquarters at the North Station, Boston. Stan Davidson is engaged with his father in the practice of architecture at 185 Devonshire Street, Boston, but says that there isn't much opportunity to practice today. Conditions do not seem to spoil Stan's disposition, according to appearances. Duke Marrs, who was with the Equitable Life Insurance Company here, has moved to Hudson Falls, N. Y., where he is in charge of production for the Union Bag and Paper Corporation. Duke should be able to use the experience obtained in his six years with the Dennison Manufacturing Company to advantage in this work. Fritz Gemmer stopped at the Institute last summer on his way to a Maine vacation. Fritz is, as you know, with the Aluminum Company in Pittsburgh.

Bill Giddon is with the R. H. Macy Company. — Gene Quirin might as well be in Little America instead of actually right around the corner from me at Babson's in Wellesley. — Jeff Harrington is purchasing agent for the Hunt-Dankin Leather Company in Peabody, Mass. — Pret Littlefield, after some time in Boston, is with the John C. Hall Company in New York City. — The grapevine telegraph reports that Web Brockelman is back in Clinton, Mass., after being in the State of Washington since graduation, but I have heard nothing directly from him. — The home city of Nashua and the insurance business still claim Blay Atherton. — Others spreading the gospel of adequate insurance are Ray Lehrer in

1924 Continued

Boston and Jack Lehman in Dayton. Dave Lasser is in New York with the Gernsback publications, their latest being "The Technocracy Review."

Tsu-Kang Hsueh was a recent visitor here. He is assistant manager of the Yung Tai Silk Filature in Wusih, China. Julian Joffe's letterhead discloses that he is a consulting industrial engineer at 295 Convent Avenue, New York. He is on the staff of the College of the City of New York, I am told. Bob Simonds is with Fish, Richardson and Neave, patent attorneys, at 84 State Street, Boston. Al Liff is district manager for Sears Roebuck in Boston, in charge of Northern New England Stores.

For the inclusion of erroneous facts and the omission of important ones, apologies; and, that this condition may be somewhat alleviated, a fervent plea for news. — JOHN O. HOLDEN, *Secretary*, 77 Summer Street, Boston, Mass.

1925

As there hasn't been any '25 news in The Review lately, I (Frank Preston) am starting a revival by the following account of what I've been doing since our Fifth Reunion. If the depression has hit you so hard that you can't afford postage on a letter, send me a postcard telling what you have been doing these past few years.

A short time before our Fifth Reunion, I left the West Virginia Pulp and Paper Company to take the position of Plant Engineer with the Scutan Company in Hudson Falls, N. Y. I took enough time off between jobs to marry Linda Williams Wheeler, Don's sister, and honeymoon in Canada, Vermont, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, and Pennsylvania. After that we settled down to keeping house. Hudson Falls was an ideal location, close enough to home so we could get there for a week-end and handy to Lake George, where we often swam in the evening after work. During the winter, even if the thermometer did get down to -20° we had plenty of winter sports to enjoy. One time, after an unsuccessful deer hunt, one member of the party wanted to know what those white things were that kept bobbing away from him through the woods. We told him and informed him of a few other things, too.

The depression finally got too much for the Scutan Company so Don Wheeler and I are farmers for a while. I have acquired a few hens and a pig, so am not likely to starve for lack of meat and eggs. Last fall I traded some eggs for two bushels of apples, but had the misfortune of having eggs drop from 40 to 25 cents a dozen before my hens could lay enough eggs to pay for the apples.

My son, born May 8, 1932 (Mother's Day by the way), has now reached the stage where he is starting to walk and making noises that sound more or less like words. His name is Roger Williams Preston, and if he and Roger Wendell Parkinson, Jr., happen to enter M. I. T. at the same time they will swap more triangles

and T'squares than their fathers ever did. Are there any more entries for the Class of 1950?

Arnold Marshall is also here helping to engineer the farm. So far, the assembly of a few pieces of farm machinery and the conversion of an old auto and sprayer into an orchard sprayer and fire engine are our only notable accomplishments.

F. L. Foster has submitted the following notes for this column:

A. A. Lauria, II, has written me that he is now located at Bowling Green, Ky., where he is still working for the Goodyear Tire and Rubber Company. Up to a few months ago he had been at the Brazilian headquarters of that company at Sao Paulo.

I received a short time ago a long, newsy letter from John J. O'Brien in which he accounts for his doings within the last several years. In May, 1928, he left the Westinghouse Company in Pittsburgh and shortly thereafter went to work for the New England Power Association, being stationed for a few months in Boston, after which he was transferred to the Providence office and put in charge of the laying out of an A.C. low voltage network. A short while after successfully completing this job, he was offered the position of superintendent of underground lines and construction for the Narragansett Electric Company of Providence and has been with this company ever since. John also informs me that he was married on February 18.

Having received so many reminders that 1925 has long been absent from the class news section of The Review, I have finally waked up and accumulated some news regarding the miners, metallurgists, and geologists. First of all there is George B. Blonsky who has been furnishing us one surprise after another by reporting from all parts of the world. This time, out of a clear sky, he informs us of his marriage in Berlin on July 10, 1932. He is still with the Dorr Company with his headquarters at 's Gravenhage, Holland.

A number of our classmates are located in Boston. Mrs. Edith Chartkoff Meyer is living in Boston, Professors Mann and Buerger are still at the Institute, and Ralph Ilsley, after working in the United States and Germany as petroleum geologist for several oil companies, is now back in the Geology Department working for his doctor's degree. — Jesse L. Maury spent the last school year here taking a special course in the Economics Department and at the present time is temporarily located in Chicago.

No direct word has come from Herb Taylor but he is still mining coal in Franklin County, Ill., for I just recently ran across an article by him in the Coal Mine Mechanization Year Book for 1932.

After several years in Arizona and Mexico, working on the flotation of numerous ores, I. M. Symonds came East a little over a year ago to enter the anthracite coal preparation work. He is now located at Pottsville, Pa., and working for the Philadelphia and Reading Coal and Iron Company. And now I must claim a little space to announce that Mrs. Foster pre-

sented me with an eight-pound boy, Richard Sears, on September 23 last. — HENRY V. CUNNINGHAM, JR., *General Secretary*, 43 Chestnut Street, Boston, Mass.

1926

Nine members of the Class attended the Annual Alumni Dinner on February 4. They were: Chester F. Buckley, Philip M. Richardson, Robert T. Dawes, Winslow H. Russell, Harry F. Howard, Natale Gada, Eben Haskell, B. J. Constantine, and your Secretary. Of the above, Richardson, Russell, Howard, Haskell, Constantine, and the Secretary are married. Russell has two children and Howard, Constantine, and your Secretary have one each. Natale Gada lives in New Haven, Conn., where he is with the General Electric Company.

The Secretary has received the following letter from W. P. Hinckley, II, who is with the York Ice Machinery Corporation, York, Pa.: "I have been back here (where I started right after leaving school) since the first of December. Most of my work is on the Dairy Equipment end of the business as a member of the Mechanical Engineering Department. My duties have to do with the rating, application, and development of both present and new design equipment."

Thomas B. Green, who is Secretary-Treasurer of the Technology Club in Hartford, was in Boston during the last week of February and attended the Alumni Council Meeting. — Bill Rooney is married and lives at 85 Braddock Street, Springfield. — Green spoke of seeing Larratt and Goodrich frequently in Hartford. — J. RHYNE KILLIAN, *General Secretary*, Room 11-203, M. I. T., Cambridge, Mass.

1928

Plans for our first big reunion are now seriously taking form and we have already had several informal discussions among '28 men around Boston. Three different resort hotels have been inspected and others will be investigated in order to secure the best possible accommodations for our first get-together as alumni.

We have already examined the records of previous class reunions and have become convinced that it will be possible to add many features of real interest this year and get them all for a smaller price than other classes have paid in former years. After all, a depression should have its advantages.

Definite information covering the details of the reunion will be released within the next few months. In the meantime, it would be very helpful to have suggestions for the event which will help us to make it a success.

The portfolio of class news is very slim this month, but we have a note taken from the University of Hawaii News Service which states that Carl Andrews is now a full professor of engineering at the University of Hawaii in Honolulu. He is an authority on tropical engineering. For a number of years he was chief engineer for the Oahu Railway and Land Company in Hawaii. The Univer-

1928 Continued

sity is the youngest land-grant university in territorial United States. Its student body comprises 1,400 persons who are drawn from many foreign countries, 21 states, and the Hawaiian Islands. The teaching and research faculty numbers 200 members.

A recent issue of the Brooklyn *Eagle* published the news of Carl Rumpel's engagement to Miss Marjorie E. Stone of Manhattan. This article gave no definite date for the marriage, but we extend the congratulations of the class. — Course VI men will be interested to know that Johnny Melcher is now covering the New England sales territory for the Leeds and Northrop Company of Philadelphia.

In a recent Technology Review, we published the news of the unfortunate fire which completely destroyed the home of Joe Parks on December 17, 1932. This fire very nearly took the lives of the entire Parks family and three of the group were in the hospital during the holiday season. We are very happy to report that both Joe and his folks made a very remarkable recovery and have started a new home in Milton, Mass. — GEORGE I. CHATFIELD, General Secretary, 420 Memorial Drive, Cambridge, Mass.

COURSE VI-A

Moved mainly by the efforts of one Ferd Myers who out in Dryden, Wash., I shall again attempt to enlighten those interested on the whereabouts of some of the fellows. First, however, I wish to apologize for my inactivity during the past year. There are no excuses to offer and no real reasons, but I just couldn't seem to get a chance to gather up the news and write it. Shortly after my last literary attempt, and my appeal for news, three fellows promptly replied with long, interesting letters, and I promptly folded up and failed to write up the news. Perhaps someone can help me find a way to blame the depression for this inactivity — maybe so, maybe so.

To dispense with old business (and this is old business if ever I saw any), the three who so ably responded are: Fritz Rutherford, at the time, from Cleveland; Harry Hardsog, who was then with the Narragansett Electric Company in Providence; and Denny VerPlanck, who was with the General Electric Company and living in Salem, Mass. Fritz wrote two letters and I did quote from his first in the last article, but to you three fellows I offer my humblest apologies for not passing your welcome news along. Try again, and I promise to do my level best to write up the news.

A more recent search for news brings forth up-to-the-minute changes, key-hole peepings, and musings. Here it is. Not having a copy of the last article handy, I cannot remember the count of Frank Sweeney's family that was quoted, but as of January, 1933, it is three, the third having been born in December, 1932. Edith, Frank, and the kiddies are now living happily in Newark, N. J., 10 Kearney Street, to be exact. Frank is with the Graybar Electric Company

trying to throw some light on the world in general with street lighting. He's the same old Frank. I had lunch with him the other day — in a speakeasy.

The New Jersey Bell Telephone Company continues to benefit by the services of Pete Zugale who lives (on week days) at 106 North Arlington Street, East Orange, N. J. Pete is still single but he is making a fine Schoen in social life. She's a great girl and was the cause of Pete's sporting a new Ford roadster.

Chick Lyons, of the Long Lyons Company, A. T. & T., has been transferred to Providence, R. I. He gets his mail at 12 Sheffield Street, Pawtucket, R. I. It was a sorry day when Chick and Pete broke up (they used to room together) and the New York night clubs particularly miss Chick. But there is also a beautiful reason why he hated to leave East Orange, and every once in a while you will find Chick heading for East Orange, Honor bound. He is also the proud possessor of a Chevrolet roadster. When Chick isn't gallivanting, you can see him at 34 Putnam Street, Somerville, Mass., spending the week-ends.

In East Orange (if all VI-A fellows ever moved out of that town, it would fold up) lives another of our crowd. Hal Curtis and his wife, Edith, are situated very comfortably at 317 Williams Street. Hal, as you all know, is with the development and research department of the A. T. & T. He spends his spare time making telescopes and fooling around with photography and astronomy. At present the chief out-door sport for the family is hiking in the Jersey Jungles.

Ferdie Myers, who has repeatedly prevailed upon me to write these notes, is located in Dryden, Wash. Ferd says that he's so far away from everyone that his only contact is The Technology Review. His latest letter reveals that he is running hydroelectric plants for Stone and Webster. They require his presence if not his closest attention. Wonder if he has any gold fish in the reservoirs? Ferd and his wife live very happily in Dryden, which, though abundant in natural beauty, is sadly lacking in social life. Well, Ferd, you ought to be happy. Natural beauty is about the only thing that hasn't been ruined by the depression.

Indirectly, I hear that Henie Wengen is getting along nicely at Poughkeepsie, N. Y. He is with the Central Hudson Power and Light and still lives at 17 Hooker Avenue. Just exactly what type of work Henie is doing now, I can't say, but I do know that he occasionally runs down in his new car to Forest Hills, L. I., and I don't think the Central Hudson Power and Light transact any business there.

Monty Burgess is living in Jackson Heights, L. I., and now and then runs off an experiment for the development and research department of the A. T. & T. Monty is also quite an expert on the market, if any. In these days when the Bulls are bare and the Bears full of bull, I can't say just which side he plays, but if he comes out ahead it's a darn good ad for Technology's economic course.

Cliff Edgar and Noel Olmstead live together at 5 Prospect Place (Tudor City) in New York City. Cliff is in the traffic department of the N. Y. Telephone Company and Noel is with the development and research department of the A. T. & T., working on mathematical, social, and other functions. It is hard to get much out of these fellows about their social activity, but they did say that if I dropped over to see them at the apartment to call up first.

When the Bell Laboratories shrunk up to fit itself into its new budget, Jim Tully was one of the many who found it necessary to seek a new means of existence, and this Jim promptly did. He is selling insurance and, though no volts, amperes, and ohms are involved, there is still resistance to be studied. I understand Jim is making out very nicely. Look how far ahead of the other salesmen you'll be, Jim, if people start paying for their policies in Kilowatts.

Yancy Bradshaw has recently been transferred from an outside job to the inside work in the studios of the Fox Movietone News. It is classed as a promotion but Brad is still doubtful about that because now he has to work Saturdays and Sundays. He is connected with the Long Island Studios and is living at 3713 Bowne Street, Flushing, L. I. As far as I can find out, he has not attempted to climb any new mountains.

Prendergast, located at the Hawthorne Works of the Western Electric Company, seems to be out of the news picture. Nobody knows anything about him. Everyone I ask says, "Do you know whether or not Prendy is married?" So for gosh sake, Prendy, write someone and ease this tension.

Jack Barnes is still a Princetonian, shaking down electrons and furnaces. That pocket full of tricks he used to exhibit at Professor Timbie's teas has grown to a satchel full. His trip to Germany did that. If anyone is ever down that way, drop in on him at 2 Greenholm Extension, Princeton. — No news about Otto Brune. That last address I have is 18 Lexington Street, Cambridge, Mass. Some rumors have it that Otto and his wife went to South Africa while others claim he is still at M. I. T. If you see this article, Otto, kindly R. S. V. P. so the gang can say hello once in a while.

Al Cary is with the traffic department of the N. Y. Telephone Company and he has invented a gadget that you put on the telephone to make it constantly busy. I say this because I called him 12 times throughout the week and each time the line was busy and I know that much business is out of the question; I work for the N. Y. Telephone Company, too. As a result, there is no information about Al except that he's working and very much alive. I did gather from his friends that his broad acquaintance has narrowed down to one but whether he is considering a merger or not, I can't say.

Armstrong, another N. Y. Telephone man, is with the traffic department also but he answers his telephone. Army lives at 10 Wildwood Terrace, Glenridge,

1928 Continued

N. J., with his wife and two (2) little girls, one 19 months and the other three months old. His wife has been quite ill for some time but I understand she is now recovering. Army says that if anyone can save up to buy a stamp, he would like to hear from some of the fellows. — Bowser is pounding pavements for N. Y. Telephone endeavoring to sell telephone service. Practically all the men in this company who had less than three years service had a chance to do this but Bowser must be extra good at it. He is living in New Jersey and from what I hear things are running quite smoothly for him. More power to you on those sales.

Ted Perkins won a wife and lost a job last year. Ted was married in April, 1932, but I don't know just when the job left him. He was with the I. T. & T. but now has a job with the R. C. A. Radiotron Company. He's fooling around with television and claims that married life and the new job agree with him perfectly. — Jim Rae and Joe Riley are still with the Long Lines Company, A. T. & T., but I couldn't get in touch with them to get any news. Jim is with the engineering department but I think Joe was transferred from engineering to traffic. — One of the fellows heard from Chet Day and he is living at 298 Belmont Street, Watertown, Mass. He says there wasn't much news except that he still had his job with the New England Telephone Company. Considering the times, that probably is news but on the whole we have all been pretty lucky.

Now only about half of the fellows are mentioned in this column and the only reason the rest of you are not included is that I haven't the slightest idea of where you are located or what you are doing, nor have I been able to learn through contacts. So how about cutting loose with a report about yourself and this time I promise to pass the news along. — HUYLER B. ELLISON, *Secretary*, 41 Wallace Street, Freeport, L. I., N. Y.

1929

There is only one marriage announcement to be made in this month's notes, that is, as far as we know. You would all be surprised to know how many similar announcements would not have reached these pages in the past, had it not been for the sharp eyes and scissors of the Press Clipping bureaus which cover the various papers of the country for the Alumni Association. In spite of their vigilance, however, there are probably announcements in the newspapers that get by them, so if you want to be sure that we get the news of your various activities, write us a note covering the latest news. We promise to print all news that gets by the censors.

The announcement is that of the marriage of Benjamin Proctor, XV2, to Miss Laura Merritt Gregg of Hackensack, N. J. Lee McCanne, XV2, was to be his best man and Bill Slagle, XV3, was to be one of his ushers. I also learned from the same newspaper clipping that Lee McCanne was Ben Proctor's brother-in-

law. We extend our best wishes and congratulations to this latest deserter from the ranks of the bachelors.

Here is a request to find out what you thought of the volume of interesting class notes that were published last month. Write a little news about yourself and tell us something that will be of use in writing up the notes for the next issue. Make it a penny postcard, or a letter, but make it your contribution to columns of interesting class notes.

Last Friday night we Akron Alumni held a supper dance at one of the country clubs and it was well attended. A record crowd of 28 couples turned out for the affair and everyone seemed to enjoy the festivities. As usual, I organized and ran the party as chairman of the Entertainment Committee, which post I am now giving up after a year and a half of it.

Larry Tufts, X, writes that he is Secretary of the Rochester Technology Club. What are you doing in your local Technology alumni clubs? — EARL W. GLEN, *General Secretary*, Box 178, Fairlawn, Ohio.

1930

COURSE VI-A

I have just returned from a very pleasant week-end with Frank Burley and his wife in Philadelphia. Frank is working for Philco Radio as a radio engineer and has developed into a veritable wizard at designing electrical filters. If anyone else in the course has any filter problems, Frank is the man with whom to get in touch. I was surprised to find out that Frank is a regular church-goer now, but discovered what I believe is the answer when he told me that he thought the minister of the church he attends was a former student electrical engineer. Such a common bond could not be lightly ignored.

Wanny writes to me from his home in North Carolina that tutoring is not always a remunerative occupation. As he expresses it, "the student takes up your time, then beats it, and you are lucky to keep your own books." Knowing Wanny, I imagine considerable exaggeration has crept into this pessimistic report. Wanny has a couple of positions in the offing which I expect will prove to be of a more rewarding nature.

Steve Prendergast, who recently rested from his labors at the Western Electric Company's plant at Kearney, N. J., long enough to spend a week-end in Boston, tells me that Ray Bowley is now in the electrical division of the Boston Police Department. — My work has lately changed and I am now assisting in making mortality studies of telephone plants for the New York Telephone Company. — EARL E. FERGUSON, *Secretary*, 60 Eaton Place, East Orange, N. J.

1931

The person who read these notes last month said that he had heard of a seamstress with a hemming way but had never heard of a Kropf with a Hemingway. Bill Hallahan has been teaching ancient history in a local high school,

a fine thing for a civil engineering graduate to be doing. I used small letters in writing that because no civil engineers have any capital nowadays. Bill says that it is an old story for him, however. — Met Ken Smith recently in one of the local resta-u-rants. I almost left u out of the restaurant which would have been a break for you. Ken says that he manages to keep busy, which is almost a crime these days. Herb Allbright is with the Lever Brothers outfit — probably in the soft soap department — living off the fat of the land as it were. Dave Buchanan dropped in from New York recently. He was on a vacation. I think that that was the word, I seem to remember hearing it once before. Dave says that he has been comfortably busy with the emphasis on the comfort.

Signs of better times are seen in the following announcements: the engagement of Miss Sarah Elizabeth Whittam of Brookline to Gilbert Ayres (Miss Whittam is a graduate of Mount Holyoke, Class of 1930. Gil is a Research Assistant in the Department of Biology and Public Health, while studying for his Ph.D.), the engagement of Miss Martha Richardson of Newton to Jonathon Biscoe (Miss Richardson was graduated from the Winsor School and from Smith College in the Class of 1929 and Biscoe is doing graduate work at the Institute. No date has been set for the wedding), the engagement of Miss Barbara Brewster Evans to Thomas Knox (Miss Evans attended the May School with the Class of 1929 and was graduated last June from Pembroke College in Brown. Knox is now connected with the East Boston Airport).

A recent brain storm left your Secretary the idea that it might be worth while for the men to send me in some information as to what they are doing, where they are doing it, why, and so on. This should be sent to me before May 15 so that it may appear in the July issue of *The Review*. It should give your friends a chance to check up on you and *vice-versa*. Think it over and let me hear from you. Write to the address below. Till next month, — JOHN M. MACBRAYNE, JR., *General Secretary*, Room 1-181, M. I. T., Cambridge, Mass.

1932

COURSE I

Well, old top, the depression is over! Eight of our fellows now have jobs. Zeke Boling is with Jackson and Moreland in Boston. Firp Follansbee is working for the Town of St. Johnsbury, Vt., on a combination steel and reinforced concrete bridge. Louis Jones is with the Illinois Emergency Relief Commission. Henry Mitchell is a draftsman for the bridge department of the Central Railroad of New Jersey. Chuck Thayer now has the distinguished title of assistant topographer with the Indiana State Highway Commission. Bill Wells is working on the levees of the Mississippi River. Lefty Hall has been a carpenter's helper for quite a while on construction work for the Christian Science Monitor Building in Boston. Finally, Louis Vassalotti is

1932 Continued

district manager for the Curtis Publishing Company in charge of boy's sales of the *Saturday Evening Post* and *Ladies Home Journal*. The rest are in the army of the unemployed and hope to get jobs soon. Wasn't the depression terrible? — ROLF ELLIASSEN, *Secretary*, 225 Orchard Street, Belmont, Mass.

COURSE VIII

Herb Neustadt dropped in to see me the other day. He has been out west in the wide open spaces where men are such and such, and so on. He says that what with harvesting, prospecting, and so on, he has managed to eat sufficiently if not regularly. Well that's something. — I see Bob Prescott, Izzy Liben, Harry Krutter, Mier Hershtenkarn, and Phil Mayo around school quite often. They are all doing graduate work. — Ran into Joe Coffey some time ago. His grin is as wide as ever.

I am sure that Jack Millman would be glad to hear from any of the boys so I will give you his address, to wit: Bei A. Karg, Brucknerstrasse 2/0, München, Deutschland. Jack writes quite regularly to Harry Krutter and any of the gang are welcome to read the letters. Just ask Harry. — CHARLES B. BRADLEY, *Secretary*, Room 4-309, M. I. T., Cambridge, Mass.

COURSE XIII

The following report is in a way a recapitulation of a previous report that I sent in some time ago. The information is guaranteed to be not over two months old, with reservations.

To begin with, the men who have found a place for themselves in the business world are Earl Hiscock, who by the way is in the Portland, Maine, office of John G. Hall and Company, and Bob Tate, who has attached himself to the Isthmian Line as an oiler or perhaps by this time he may have been raised to something better. The last ship that Bob was on was the *Steel Trader*. Some of you may remember our struggles on the weight calculations of the *Steel Chemist* which is run by the same line. Bob's mother was the kind donor of the above information. Tyson Lykes has gone with the family firm of Lykes Brothers in Florida.

The next group are those, as Dick Berry expressed it, who are among the dollar-a-year men. Dick is holding one of these jobs with the Puerto Rico Shippers Service in New York. From what he said it would appear that his job was to chase around for cargoes and it was proving very interesting. Another member of our course who has a similar job is Bob Fife, only his expression is that it is a pay-as-you-go position. He is with Burgess and Donalson designing yachts and, surprising as it may seem in these times, the company has some to design.

Among those who are still at school either studying for a master's degree or just there are: Gene Worthen, Harold McCormick, George Daniels, and your Course Secretary. Gene and Mac are studying for their master's, the former in Naval Architecture, the latter in Business Administration. The rest of us are no more than just there, keeping the wheels from getting rusty.

The last group consists of those still shining up the door knobs to executives' offices and vainly hoping. Its members are: Bannon, Gustafson, Schulze, and Fra Giacomo. Schulze, however, has obtained his third engineer's license and has been fortunate enough to go out on the trial trips of the *Lurline* and *Portland*. Gus was on the *S. S. Morro Castle* last but that job seems to have vanished now.

Fraser Casey might be said to be in a class by himself as he is down at Pensacola learning to fly in the Naval Reserve flying school. From a letter received shortly after Christmas, he was enjoying the training very much and looking forward to staying there until he had learned to fly about all the different types of planes that the Navy has.

At the Alumni Dinner held in Boston a short time ago, our course was very well represented, considering the fact that we have scattered so much since graduation. There were five of us in all. Earl Hiscock came down from Portland, Bill Bannon came up from New Bedford, and George Daniels, Gene Worthen, and your Secretary were among those present. It was regretted that more of our number could not have been there to hear an extremely good address by Sir Willmott Lewis of the *London Times*, instead of reading a rather poor and quite erroneous résumé in the newspapers.

If the above information is incorrect, don't blame your Secretary, blame yourselves. — F. BINGHAM WALSH, *Secretary*, 8 West Hill Place, Boston, Mass.

NEWS BULLETIN

(Concluded from page III)

gliding and soaring meet at Elmira, N. Y., last summer, and to him the students in gliding look for instruction in making use of air currents.

Dr. Lange spent more than ten years in the development of gliding in Germany through research on the meteorological possibilities of motorless flight. He is a Three-Gull pilot, the highest rating of the Fédération Aéronautique Internationale, and is entering enthusiastically into the development of this sport at Technology.

Lieutenant Henry B. Harris, chief pilot of the Institute's meteorological station at the Boston Airport, is also a qualified glider pilot and is cooperating with the students in flight instruction.

The Hallerhawk sailplane, one of the most graceful of its type, has been reconditioned and re-covered by members of the aeronautical society. It will be given

laboratory tests for strength and is expected to be ready for flight tests early in the spring. Known as a "Professor" sailplane, the glider was built in Germany by the Roön-Rossitten Gesellschaft, and is of a type which has established many records in that country.

The single wing, which has a span of over 55 feet and an average breadth of only about five feet, is made in three sections of equal length. The middle one is bolted to the fuselage at its center and at its outer ends with struts.

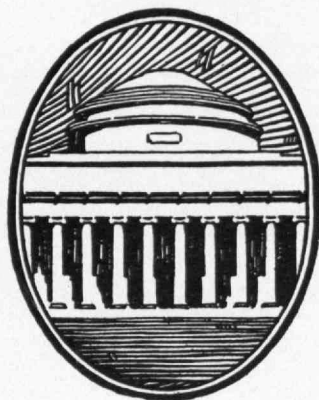
The two outer sections are unsupported externally, but are held to the center section by two bolts at the top and bottom of the very deep front spar, and by one bolt at the rear spar. Most of the load, in both the center and outer sections, is taken by the extremely rigid structure formed by the front spar and the plywood forming the leading edge.

Plywood has been used throughout the whole ship, almost the only parts not made of it being the wing and tail ribs. This makes for an extremely light and strong structure. The fuselage is mono-

coque; that is, the plywood covering, supported by plywood bulkheads, takes all the load, unsupported by any strong longitudinal members. The landing gear is a wooden skid under the forward part of the fuselage.

Extraordinary aerodynamic "clean-ness" makes possible the very high performance of this ship. Its sinking speed is about two feet per second; at most favorable flying speed, which is about 30 miles per hour or 40 feet per second, it goes forward 40 feet for each two feet of lost altitude. This means that the best gliding angle is about one in 20.

Purchase and operation of the sailplane is entirely a student project. It was on public exhibition for the first time at a recent meeting of the society, when Dr. Lange discussed developments in gliding and showed motion pictures of the Elmira meet. Lieutenant Harris discussed qualifications for pilots. George P. Bentley '33 of Quincy is President of the society, and James B. Kendrick '34 of Hamilton, Mo., who has studied gliding in Germany, is Vice-President.



INFORMATION

THE TECHNOLOGY REVIEW BUREAU exists to supply authoritative information to anyone interested in details regarding the Massachusetts Institute of Technology. It serves as a clearing house for inquiry and aims to further the spread of exact information regarding entrance requirements, outline of courses, subjects of instruction and other information which may be of aid to the students considering undergraduate or graduate study at the Institute.

The Institute publishes a variety of bulletins, fully descriptive of individual courses, as well as a catalogue of general information essential to the entering student. The Technology Review Bureau will be glad to send, gratis and post free upon request, one or more copies of any publication listed below, or to forward any special inquiry to the proper authority.

Ask for the following circulars by their descriptive letters:

AB: For general information, admission requirements, subjects of instruction, ask for Bulletin AB.

C: For announcement of courses offered in Summer Session, ask for Bulletin C.

D: For information on Advanced Study and Research Work, ask for Bulletin D.

E: For the reports of the President and of the Treasurer, ask for Bulletin E.

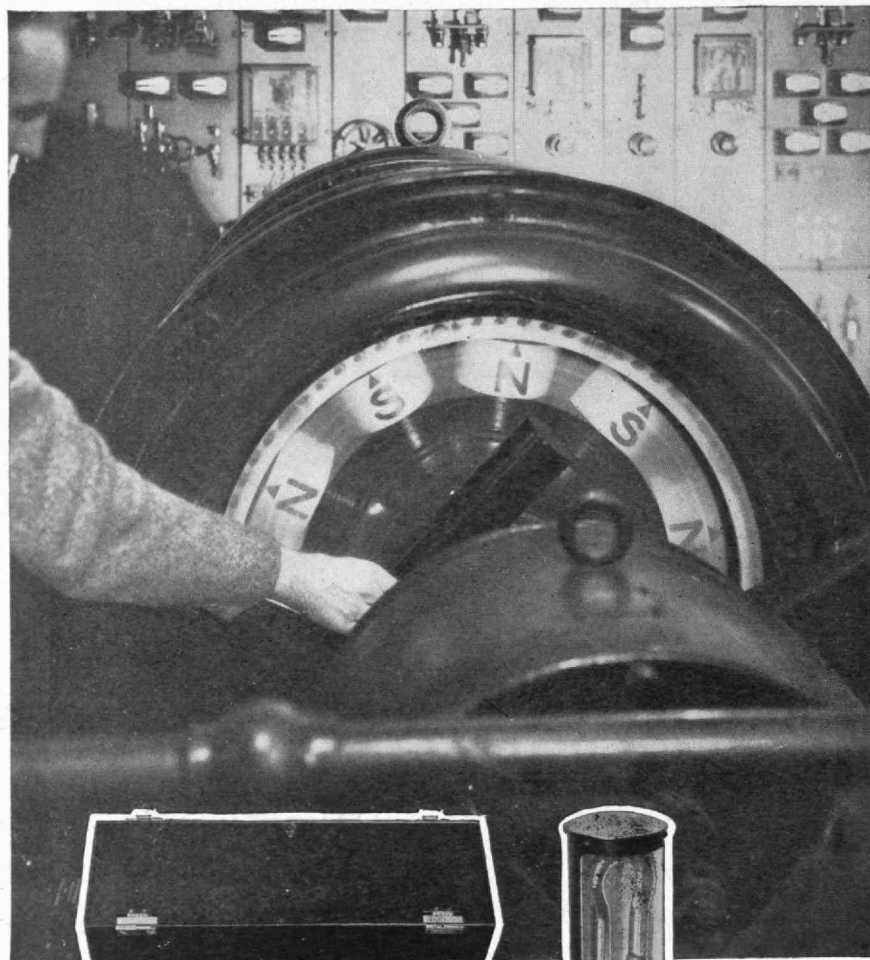
Y: For a popularly written explanation of Engineering Courses, ask for Bulletin Y.

All inquiries sent to the address below will receive prompt attention

THE TECHNOLOGY REVIEW BUREAU

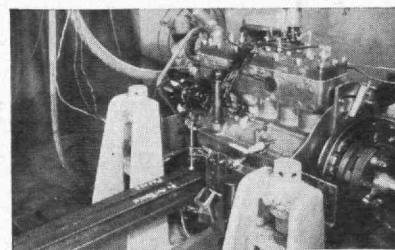
ROOM 11-203, MASSACHUSETTS INSTITUTE OF TECHNOLOGY
CAMBRIDGE, MASSACHUSETTS

720 R. P. M. ... Yet this generator appears motionless
when illuminated
by



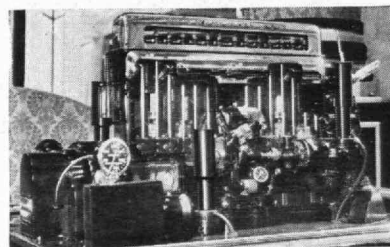
The **EDGERTON** **STROBOSCOPE**

This is graphic proof of the brilliancy and motion-stopping ability of the Edgerton Stroboscope. You, too, can use it for studying and demonstrating machinery behavior in slow motion at speeds as high as 20,000 or 30,000 r.p.m. Note these typical applications



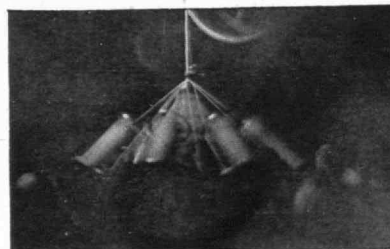
RESEARCH

Chrysler Corporation's engineering laboratory measures the amplitude of crankshaft vibration as a function of engine speed



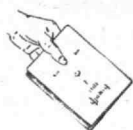
SALES

General Motors displayed Buick and Pontiac engines in stroboscopic slow motion at the New York Auto Show



PRODUCTION

The Edgerton Stroboscope checks the operation of a high-speed cable wrapping machine in the Simplex Wire and Cable Company's factory



This bulletin gives you all the facts!

The Edgerton Stroboscope is a practical commercial application of the familiar stroboscopic principle by means of which rapidly moving phenomena can be observed in slow motion. The compactness and portability of the unit, the unusual actinic brilliancy and short duration of the flash, and its ability to stop motion at high speeds makes the performance of this new stroboscope an outstanding industrial achievement.

PRICE: \$290

A complete description of the stroboscope is printed in Bulletin Et-3212. Uses are suggested, operating limits are defined, and other data presented upon which you can base further specific inquiries as to its application to your problems.

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